

Contractors and Engineers Monthly

46. No. 2

FEBRUARY, 1949

\$3 a Year, 50 Cents a Copy

covering the Field

Bridges That Failed, Replaced

A new bridge will soon replace the one pat failed over Tacoma Narrows—page 1. And a steel-girder bridge has replaced a ver truss bridge that failed—page 83.

Expressways Shape Up

For typical grading and drainage jobs on Chicago-Detroit Expressway, see page 1. For Atlanta's proposed expressway system to solve traffic snarls, see page 50.

Power Plant, Hospital

by power plant gets its third enlargeter a new wing. Story on page 2. oft mud poses foundation problem as pital is built over springs: page 86.

Salaries of Maintenance Men

Do you know how they stack up against ose in industry? And what about retireent, vacations, etc? Answers, page 5.

County Airport Enlarged

Improvement contract covered on page includes grading, drainage, and paving.

Latest Slant on Overtime Pay

How the Supreme Court's overtime-onertime decision affects the construction dustry. Analysis on page 17.

Public Told About Snow Removal Pennsylvanians no longer take snow re-

oval for granted. Department radio talk out it is summarized on page 21.

Lock Job at Chain of Rocks

Oredge, drills, and draglines excavate; whirley cranes on trestles lift concrete high wall pours—page 23.

Dirt Work for Soil Conservation

How a soils contractor shapes farms for rigation is told on page 32.

Resurfacing With Hot-Mix

deterial for 1.8-mile job is hauled 55 as reported on page 43.

Roadside Planting Policy

Missouri practice and how it evolved is torth in an article on page 54.

Dams—Clearing, Concrete

Read on page 56 how vacuum mats suck vater from concrete at Dorena Dam. And on page 63, how tractors and cable lear Hungry Horse Dam reservoir site.

Dredge Pumps Levee Fill

Structures will protect rich farming free from floods. Page 66 tells how the hydraulic fill was dredged and placed.

Cement-Treated Road Base

Page 73 tells story, from mixing and wing through compacting. Pictures, too.

Cutting Road Costs by Design

Salvage value and permanency affect annual costs, article on page 78 explains.

Dual Concrete Highway

The 5-mile job described on page 89 converted a 2-lane road to a 4-lane width.

County Improves Its Roads

Road betterment and road maintenance hand in hand in Ohio county—page 101. You will find "In This Issue" on page 4.)

New Bridge Will Rise Over Tacoma Narrows

By RAYMOND P. DAY, Western Editor

→ THERE have been many explanations of why the Tacoma Narrows Bridge failed in November, 1940, only four months after its dedication. Some of them have been involved, some simple. But perhaps none is as simple as the statement of one of the consulting engineers who, after investigating the disaster, said, "The wind blew it down".

Today, over eight years later, work is under way on the reconstruction of the famous bridge which will span the cold blue waters of the Tacoma Narrows, linking the Washington mainland with Bremerton and the Olympic Peninsula. The work is being financed and supervised by the Washington Toll Bridge Authority, and two contractors are starting it under Washington Department of Highways contracts.

Bethlehem Pacific Coast Steel Corp.

Contractors to Rebuild Famous Structure Swept Down by Wind Stresses After Four Months' Use

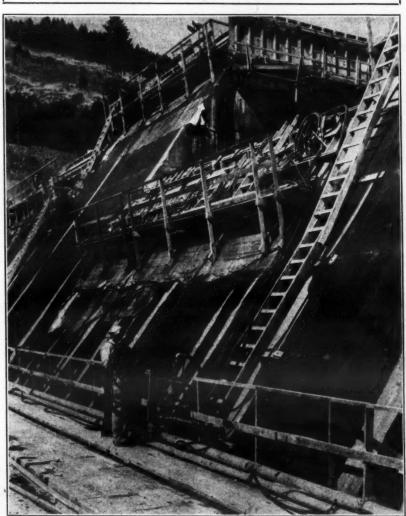
of Los Angeles has the \$8,264,000 contract for the major portion of the new structure, and John A. Roebling's Sons has a \$2,932,000 contract for anchor bars, cable, and hangers. The concrete work and a few miscellaneous items like the placement of embedded metal have been subbed to the Tacoma contracting firm of Woodworth & Co., Inc.

Original Bridge Fails

The failure of the original Tacoma Narrows Bridge has given aerodynamicists food for conversation for years. The original structure was finished and dedicated in June, 1940. Shortly after its dedication, engineers noticed that

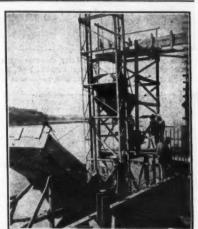
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CONCRETE IN DAM HARDENED BY VACUUM PROCESS



C. & E. M. Photo

A suction-treated concrete pour at Dorena Dam in Oregon—with the hose and nipple of the vacuum process in place. Dorena Construction Co.'s use of this method o case-hardening concrete surfaces is covered on page 56.



This view of a pier pour on the new Tacoma Narrows Bridge shows a Woodworth workman with a Bell buggy taking a load of concrete from the hoisting tower of a 2-yard Mirermobile.

Grading, Drainage For Express Route

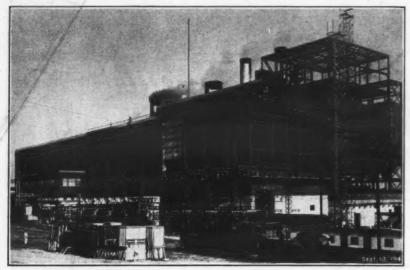
Good Start Made in 1948 On Roadway Contracts for 9-Mile Project Between Chicago and Indiana Line

THE year 1948 saw the new 9-mile express highway south of Chicago, Ill., definitely shaping up as several grading and drainage contracts got under construction. This badly needed limited-access road, beginning near the south city line, will eventually carry traffic around the congested mill area south of Chicago, as part of the proposed Chicago-Detroit Expressway. The latter highway will by-pass several large industrial communities in Indiana and Michigan, and when completed will reduce by 2 or 3 hours the time that is required at present to drive between Chicago and Detroit.

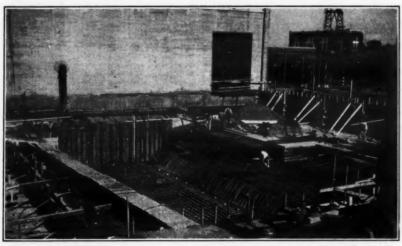
The Illinois portion of this expressway consists of two continuous sections. The upper north-south end, called the Calumet Super Highway, begins at 130th Street and Doty Avenue within the Chicago city limits. Doty Avenue has a dual two-lane pavement, and runs south out of the metropolitan area along the west side of Lake Calumet. The Calumet Super Highway extends south from Doty Avenue, past the city line, to a point south of Bernice Road in Cook County. Here the new road swings to the east continuing to the Indiana state line. This east-west section is known as the Tri-State Highway.

This Illinois highway is a Federal-Aid project, with the Federal government bearing 50 per cent of the cost of construction of the sections awarded by the State. Started in 1946, the Illinois sections of the overall Chicago-Detroit Expressway are scheduled for completion by 1950. The Indiana and Michigan portions of the project are not expected to be completed for another 10 years.

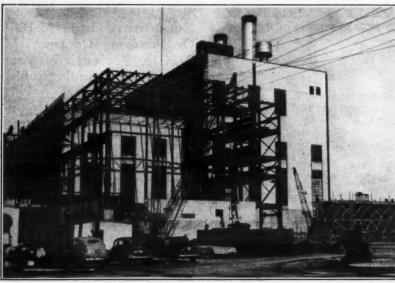
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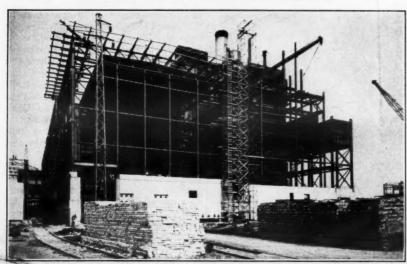


Construction Co. is building on the Indiaka, Ind., extends the length of the str measures 204 feet north and south.



reinforcing steel for a concrete foundation pour is placed in the excavation for the 75×104 -foot boiler room on the south side of the new wing.





the level of the turbine room the walls are red brick. Bricklayers worked from affolds shown here, and bricks were raised to the scaffolds by this 200-foot hoisting tower operated by a Clyde 2-drum hoist powered by a Buda engine.

New Wing Is Added To Big Power Plant

Steel, Concrete, and Brick Structure to House High And Low-Pressure Turbine For Indiana Steam Plant

By WILLIAM H. QUIRK, Eastern Editor

+ THE Twin Branch Plant of the Indiana & Michigan Electric Co. at Mishawaka, Ind., which has been world-famous since 1940 for having the highest-pressure (2,500 psi) utility boilers and turbines in the United States, is being enlarged by the addition of a 2,000-psi 1,050-F 125,000-kw (name plate) generating unit. This will increase the total rated capacity of the plant to 366,500 kw, although its capability for serving the states of Indiana and Michigan is greater. The plant is located on the outskirts of Mishawaka, just east of South Bend, Ind., and about 300 feet from the St. Joseph River. It is one of the key plants of the 7-state American Gas & Electric Service Corp. Central System, which stretches from Lake Michigan to the North Carolina border.

The building addition is being erected by Sollitt Construction Co., Inc., of South Bend, Ind., which has already enlarged the plant twice in the past. Actual construction on the big project got under way in June, 1947, and the extension is expected to be ready for service from the new turbine-generator this spring. When the extension is completed, the overall dimensions of the plant will be 420 feet long from east to west, and 330 feet wide from north to south. The cost of this addition plus equipment being installed will be around \$15,000,000.

Addition at West End

The new wing is being added at the west end of the existing plant, and is the same type of steel, concrete, and brick construction as the rest of the building. It extends the length of the structure 103 feet west, and measures 204 feet north and south. It is not as wide as the original plant because of a jog in the side of the latter. Two main sections comprise the addition. On the north side is the turbine room, 103 x 100

American Gas & Electric Corp. Photo.

feet, while on the south end is the broiler room, approximately 75 x 104 feet. The existing structure steps in on this side, making the boiler room somewhat smaller than the turbine room

In height the power plant is impressive. It goes up 155 feet from a ground elevation of 706 to elevation 861 over the boiler-room section. Top elevation of the turbine room is 800. It has floors at five levels above the turbine its which is on the 730 elevation.

General Electric Co. will furnish new turbine composed of high and lapressure machines on separate shafts but working as a single unit. The nighpressure turbine will operate on 2,000-pound pressure, 1,050-F steam, at 3,600-pound pressure. rpm. The low-pressure unit (com-posed of an intermediate-pressure unit in tandem with a double-flow low-pressure turbine) will receive steam under 400-pound pressure at 1,000 F and operate at 1,800 rpm. The larger low-pressure unit runs on the exhaust from the smaller high-pressure machine. The low-pressure unit is so long that it will be placed at a 45-degree angle within the turbine room; otherwise, the room would have had to be made wider.

The powdered-coal-burning boiler that supplies steam for the turbine is about 40 feet square, and extends up-ward from elevation 704 to a plane just beneath the 815 level, or about 110 pet. It can generate 935,000 pounds of steam per hour. The combustion chamber is walled with water tubes which absorb the radiant heat and generate most of the steam. Convection tubes do the rest and also help heat the boiler feed water and superheat and reheat the The coal bunker for the boiler is 73 feet long x 21 feet 3 inches wide, and is 72 feet high, extending from elevation 746 to elevation 818. It holds 2,000 tons of coal. Over the boiler room is a 150-foot-high smokestack, 13 feet in diameter at the top and 151/2 feet in diameter at the bottom.

When the addition is completed, the power plant will have eight turbines, three of which are high-pressure and the rest low-pressure. The plant also has eleven other boilers in addition to the new one.

(Continued on next page)



This picture was taken looking down on the 103×100 -foot room new turbine for the plant. The low-pressure unit of the turbine be placed at a 45-degree angle in the turbine of the state of the stat which will house the

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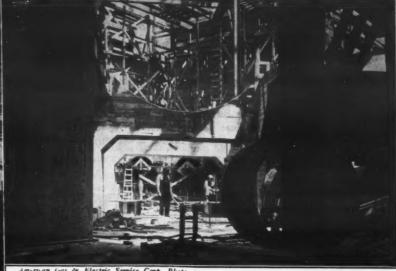
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American Gus & Electric Service Corp. Photo
Two views of the condenser foundation at the Indiana & Michigan Electric Co. powerplant extension—at left, looking southeast on the center line of the condenser at elevation 706; above, looking east and showing sleeves of the intake water pipe in place.

Concrete Foundation

The foundation was excavated with cranes and clamshell buckets which dug out a hole to a depth of 17 feet below the level of the ground, or to elevation 689. Only 300 feet away is the St. Joseph River which is dammed to form Twin Branch Pond and thus provide cooling water for the condensers. The crest of the dam is at elevation 717.62; the normal water above the dam is at elevation 717.37; below the dam the water is at elevation 694 plus or minus.

To counteract probable seepage from this large body of water, as well as normal ground water, the contractor installed a Moretrench wellpoint system around the hole. Risers 19 feet long were used; 75 were required at 5-foot centers for the turbine room, and 46 on 7-foot centers at the boiler room. The water was pumped into an 8-inch header pipe that rimmed the hole, and then discharged back into the river below the dam.

Over the turbine-room area a solid concrete mat 4 feet thick was laid; a 5-foot mat was laid for the boiler-room foundation. The concrete side walls are from 20 to 36 inches thick, and extend from the foundation up to elevation 730, the turbine-floor level. Above that the walls are brick.

Batch Plant

A concrete batch plant was set up within the power-plant property on a siding of the New York Central Railroad. Diamond portland cement in bulk was unleaded from cars and stored in a Blaw-Knox 200-barrel cement bin with the aid of a screw-type conveyor and enclosed elevator. Additional storage was provided in a 340-barrel silo, 30 feet high x 10 feet in diameter, constructed of galvanized steel supplied by Carnegie-Illinois Steel Corp.

Washed sand and gravel for the fine and coarse aggregate was supplied by local sources from South Bend, delivered to the job in trucks, and stockpiled alongside a Blaw-Knox 100-ton two-compartment aggregate bin. A crane with clamshell bucket kept the bin charged with material. On a platform beneath the aggregate bin, two CMC 28-S electrically driven concrete mixers were set up. Water for the mix was tapped from a main at the power plant. The cement, sand, and gravel were weighed out and dumped into the mixer drums, and the water was added. Darex air-entraining agent was employed in the mix.

The mixed concrete was discharged out the side of the plant into steel-bodied Studebaker trucks which held 3 cubic yards of concrete. They hauled the material to the pour being made, and dumped the concrete into buckets, either 1, 2, or 3-yard size. Cranes then lifted the buckets to the forms where

(Continued on page 71)

Where a pavement meets a severe test

Newark (N. J.) Airport

OPERATED BY THE PORT OF NEW YORK AUTHORITY

Laying resilient, heavy-duty Texaco Asphaltic Concrete paving on this airport's loading area





The Standard Bitulithic Company of Newark constructed the two-course, 4-inch Texaco Asphaltic Concrete pavement on Newark Airport's loading area.

The pavement constructed on the loading area of a major airport must possess exceptional ruggedness, if it is to give lasting service with low upkeep cost. While moving over the airport's runways and taxiways, the big commercial airliners which land at Newark are partially airborne, reducing the load on the runway or taxiway pavement. However, while these planes receive and discharge passengers and cargo on the loading area, the pavement here must support the airliners' full weight.

On Newark Airport's loading area, the Port of New York Authority is constructing a two-course Texaco Asphaltic Concrete pavement, four inches thick, over a bituminous penetration macadam foundation. This resilient, heavy-duty pavement is a logical choice wherever traffic conditions are most severe—including a city's principal thoroughfares.

For complete information on Texaco Asphaltic Concrete and other heavy-duty types of asphalt paving, write our nearest office for copy of the booklet, "Texaco Asphalt Paving—Plant-mixed Types."

THE TEXAS COMPANY, Asphalt Sales Dept., 135 E. 42nd Street, New York City 17 Boston 16 Chicago 4 Denver 1 Houston 1 Jacksonville 2 Philadelphia 2 Richmond 19



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Construction in 1949

At this time it is still too early to judge whether or not 1949 will hit the new construction record predicted late last year by the U.S. Department of Commerce. The Department estimated that a dollar volume of \$18,750,000,000 would be set in 1949. This would represent an increase of more than 5 per cent over 1948 construction, and a total never before approached in this country. Yet even if the forecast is correct, the physical volume of con-struction will be no greater than last year's; moreover, it will be well under the physical-volume records set in 1942 the late 1920's.

The reason for this inequality between dollar-volume and physical-volume verrising costs of construction. During 1999 these properties are the second to the second the second to the second the second to the secon ing 1949, these costs will rise 5 per cent above the average for 1948, the Department predicts. If the increase is held to only 5 per cent, it represents to the optimist a gain against the

inflationary trend. Looking back to the booming 1920's, we can clearly follow the spiral we have been ascending. During the 5-year period from 1925 through 1929, the yearly physical volume of construction was greater than it will be for 1949, according to the forecasts. Yet the average expenditure for construction was less than \$11,000,000,000 per year, as contrasted to the nearly \$19,000,000,-000 slated for spending this year. Even in 1942, when approximately \$13,500,-000,000 was spent, more physical con-struction was achieved than will be realized during the coming year. In the past 6 years, construction costs have jumped over 28 per cent on this basis

of comparison.

Estimates by the Labor and Commerce Departments are predicated on the assumption that national income continue to soar, and that there will be no general recession in 1949. Also, that expenditures for national defense and foreign aid will remain about where they were in 1948. But on the other hand, some traces of a leveling-off trend are faintly discernible. Business inventories have been moving steadily higher, and several big industries have been catching up with orders. Some equipment dealers notice a shift from a sellers' to a buyers' market, and furthermore report that their customers are asking for credit.

Of the estimated \$18,750,000,000 to be spent in 1949, about \$5,000,000,000 will go into new public construction, and the remainder into private construction. In the latter category, residential con-struction will be the largest item with \$6,500,000,000; the rest is scheduled for industrial, commercial, utilities, and other non-residential building. With the population increasing from 120,-000,000 in the 1920's to an estimated 147,000,000 as of this year, this country needs more physical volume of con-

struction than it ever did. But it is not going to get it. This year looks like a big year in construction, and it may well be, as far as dollar volume is concerned. It can hardly be a boom year, however, measured in terms of physical construction. The nation's construction requirements will be a long way from being met even at the end of a record 1949.

The cooperation of all industry is needed if sufficient steel scrap is to be available for steel production during 1949. America still has a fight on her hands—a fight for increased production to meet the needs of the country, and insure national security and welfare. The construction industry is urged to do its share by joining the Industrial Steel Scrap Drive, and making its steel scrap available.

Fla. Road Builders **Elect New Officers**

The Florida Road Builders' Association has announced the results of its recent election of officers and directors. Albert Deermont is President; John R. Phillips, Vice President; and J. Hamilton Dowling, Secretary-Treasurer. John A. Long was reappointed Executive Secretary to have direct charge of the Association's management.

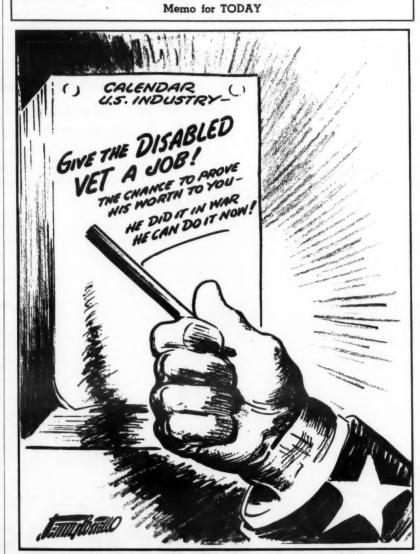
Named to serve on the Board of Directors are: J. W. Allen, Tampa; Fred Caddell, Jacksonville; E. T. Collier, Miami; L. L. Hall, Jacksonville; E. G. Langston, Jr., Orlando; R. L. Banner-man, Tallahassee; Shaw Pearsall, Ocala; and Muse Womack, Tallahassee.

District Committee Chairmen are: John A. Benton, St. Petersburg; S. M. Wall, Gainesville; W. H. Faulk, III, Tallahassee; William Day, Orlando; Wyatt B. Hodges, Ft. Lauderdale; and Frank E. Hubbard, Orlando, The District Committee Chairmen have no part in the Association government but are named as contacts in the various sections of the state.

Several matters were discussed at the December meeting of the officers and directors: among them, continuing sup-port of the University of Florida's annual Highway Conference, an expanded program of public relations and highway education, the adoption of a resolution of support and cooperation with the new administration in its highway program, and the adoption of the Association's annual budget.

Library of Color Slides On Roadside Development

A traveling library of Kodachrome 35-mm slides which illustrate established roadside-development policies and practices will soon be available. It is being set up by the Committee of



This cartoon by Jerry Costello was declared best in 1948 national competition sp sored by Disabled American Veterans among editorial newspaper cartoonists. C tello is with the Albany (N. Y.) Knickerbocker News and his cartoons are distribu-by the General Peatures Corp. of New York City.

Airports Bituminous Paving Book Review Bridge Construction Building Construction Chain of Rocks Locks Clearing Concrete Paving Convention Calendar Convention Reports County Road Work Dam Construction Distributor Doings Dredging . 43 .103 , 83 , 86 . 23 63 65 .39, 104 98, 99, 100 Editorial Expressways Grading Highway Costs. Highway Maintenance. Highway Safety Legal Decisions. .37, 38 Levee Construction...... Overtime Pay Ruling...... Road-Base Stabilization. Roadside Development.... .54, 81 Safety Snow Removal and Ice Control... Soil Conservation

In This Issue

10

Education of the Roadside Development Section of the Highway Research Board, under the chairmanship of Dallas D. Dupre, Jr., Landscape Architect, Ohio Department of Highways, Columbus, Ohio.

These slides will be collected from each state which has been or will be each state which has been or will be carrying on outstanding roadside-development work. And they will be made available to any and all states which want to learn what the other fellow is doing and how he's doing it.
The library of slides will not show

scenic views, historical sites, or other subjects not specifically practical in promoting good roadside-development work. The policy of the Committee will be to secure and edit slides which tell a story of outstanding roadside-development design, conser-vation methods, work operations, maintenance procedures, and so on.

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A fair start has already been made in collecting the slides, the Committee says, and very shortly the first sections of subjects will be ready for distribution. State highway departments which want to apply for the loan and use of these slides should write to the Chairman of the Committee, Mr. Dupre. Later on, as the collection enlarges, the traveling library will be made available to county, township, and other political subdivisions.

Text on Welding Design

Winning papers in the "Design-for-rogress" Award Program have been Progress' compiled in book form by The James F. Lincoln Arc Welding Foundation. The book contains abstracts from 82 reports, and was edited by Professor R. S. Green, Acting Chairman of the Department of Welding Engineering of Ohio State University.

The book is divided into nine main

sections. Each section contains papers describing the use of welding methods in a different field. Papers are complete with design data, cost data, and a full analysis of welding procedures. The book contains over 1,000 pages of text

material, and is well illustrated.
"Design for Welding" is bound in a semi-flexible simulated-leather cover. It can be secured by writing to the Foundation at P. O. Box 5758, Cleveland 1, Ohio. Price is \$2.00.

There were more cars on the highway in 1948 than ever before, and travel rose from 370,000,000,000 miles in 1947 to an estimated 395,000,000,000 miles last year, the PRA reports. Motor-fuel consumption reached a new all-time high, with state gas-tax receipts estimated at \$1,350,000,000 — more than \$140,000,000 over the 1947 total. January 1 to December 1, highway projects amounting to \$1,056,442,000 were placed under contract, and totaled 37.422 miles.

Salary, Job Benefits For Maintenance Men

Joint Committee Reports
On How Much Maintenance
Men Are Paid; Department
Policies Affecting Them

+ SOME interesting data on the salaries which state highway departments pay their maintenance personnel, and what policies they have adopted towards them concerning vacations, sick leave, retirement plans, etc., make up the major part of the 1948 progress report of the Joint Maintenance Personnel Committee of the Highway Research Board and the American Association of State Highway Officials. The report was prepared for the annual AASHO meeting held in Salt Lake City last September, and the annual HRB meeting in Washington, D. C., in December.

In addition to tabulating these data (which are summarized in the tables on the next page), the Committee makes some recommendations in this, its fifth, report.

What Attracts Men to Jobs?

In an earlier report, its second, the Committee said in part:

"What is it that attracts a man to a job? There is every reason to believe that the average man on a wage or salary desires economic security more than anything else... The first essential of economic security would appear to be adequate assurance of continuity of service....

"Equally important . . . is the payment of fair wages and salaries. Fair wages and salaries imply not only that the wage or salary is equal to that paid by other organizations for the same type of work, but also that a fair relationship must exist between the wages and salaries paid to various jobs within the highway organization. Determination of relatively fair wages and salaries can be accomplished by a job-evaluation plan.

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"Job evaluation consists mainly of an analysis and pricing of jobs, or, as one author defines it, 'a measurement of the qualities and abilities necessary to carry the load under the assigned conditions of work'."

To corroborate these statements made in the 1946 report, the 1948 report cites a recent study made by the National Industrial Conference Board, in which the employees of six manufacturing companies were asked to indicate the five job factors they deemed most important to their morale. Out of the 41 factors they listed in all, job security was considered one of the five most important by nearly half (45 per cent) of the employees. Other factors included among the five most important were: compensation (wages), by 43 per cent of the employees; opportunity for advancement, by 36 per cent; type of work, by 21 per cent; and the practice of informing the employee of his job status (both his successes and his failures), by 19 per cent.

A group of employers and a group of

A group of employers and a group of employee representatives had been previously asked to predict the factors the employees would select. Both of these groups selected compensation as the most important factor, 75 per cent placing it among the five most important. Not one of the fifty executives participating included among the top five the so-called "How am I doing?" question (the practice of informing the employee of his job status).

Job Security

The progress report turned next to these five factors as they affect the highway maintenance employee. It found that job security as exemplified

by a civil-service system is in full effect in ten states. In an additional seven states, some of the employees—usually the salaried ones—are covered. The second measure of job security is the reputation of the employer. Although this cannot be measured in exact figures, it probably has a greater effect than any other single factor on the employee's selection of employment. The reputation of the employer can be just as effective in the highway maintenance field as in the manufacturing industry.

Compensation

The job factor which employees considered second in importance in the study conducted by the National Industrial Conference Board was compensation. Comparing the average hourly

wage rates in the highway maintenance industry with those in the manufacturing industry from 1935 to date, the Committee pointed out in its report that the wage rate of the average highway maintenance employee is, and has been since 1935, very much lower than that of the average manufacturing employee.

The manufacturing employee received an average of 55 cents per hour in 1935 and now receives an average of \$1.25 per hour. The highway maintenance employee received an average of only 42 cents per hour in 1935 and now receives an average of only 88 cents per hour. If these wages are compared with the Food Cost Index and the Consumer's Price Index since 1935, it will be noted that the wages of both manufacturing employees and highway maintenance employees rose slightly

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Are your maintenance employees under a civil-rvice plan?
Do you consider the system of civil service in fect in your state to be advantageous to the veration of your department?

Salary, Job Benefits For Maintenance Men

(Continued from preceding page)

more than the Food Cost Index and much more than the Consumer's Price Index. It is, however, a well known fact that the economic position of all labor was at its lowest in 1935. This position improved gradually up to 1940. If the wages and living costs are compared on a 1940 base, it will be noted that the wages of both manufacturing and highway maintenance labor have not increased as fast as food costs but have increased slightly faster than the Consumer's Price Index.

The fact is, then, that highway maintenance labor, although it has had very 2-C. Which classification of employees are covered by civil service?
 2-D. When did the plan go into effect?
 3. If answer to question No. 1 is "no", is it your opinion that your department would be strengthened.

nearly the same percentage of wage increase as manufacturing labor, has not had the same dollar increase and that, consequently, there is now a larger dollar differential between highway maintenance labor and manufacturing labor than there was in 1935. This fact creates a definite tendency for labor to move from the highway maintenance to the manufacturing industry.
In its report, the Maintenance Per-

sonnel Committee again directs attention to the wide variation in salary for jobs defined the same way in the various state highway departments. Some of this variation, the report says, can possibly be accounted for by the dif-ference in job content of jobs with the same title, but this reasoning cannot

(Continued on next page)

by the establishment of a civil-service system for maintenance employees?

4. Are your maintenance employees covered by a workmen's compensation plan?

5. Do you consider the workmen's compensation plan in effect in your state to be advantageous to the operation of your department?

5. A. When did the plan go into effect?

6. Does your department make workmen's compensation payments direct or buy insurance?

7. If answer to question is "no", is if your opinion that your department would be strengthened by the establishment of a workmen's compensation?

8. Does your department expect to make any effort to place your employees induced workmen's compensation?

9. If answer to question No. 4 is "no", doe you grant any leave to employees injured in line of dut?

10. If answer to question No. 4 is "no", doe your department encourage the employees included in any state-sponsored or controlled retirement plan?

12. Do you consider the retirement plan in effect in your state to be advantageous to the operation of your department?

13. How long has the retirement plan for maintenance employees?

15. Does your department contemplate making any effort to establish a retirement plan?

16. If answer to question No. 1 is "no", does your department?

17. Do you consider the retirement plan for maintenance employees?

18. How long has the retirement plan for maintenance employees?

19. Do you consider the retirement plan for maintenance employees?

19. Do you consider the retirement plan for maintenance employees?

19. Do you consider the retirement plan for maintenance employees?

19. Do you consider the retirement plan for maintenance employees?

19. Do you consider the retirement plan?

19. How long has the retirement plan?

19. How long has the retirement plan?

19. Long your department ontemplate making any effort to establish a retirement plan?

19. Long your department would be strengthened by the establishment of a retirement plan?

19. Long your department would be your department have any plan whereby employees are re

18. If not all employees, what group do receive an

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move frequently their actual expenses, a per diem allowance, or an increase in wage over stationary crews? 35. Do you pay women engaged in maintenance work? the same wage as men engaged in the same work?

MINIMUM - MAXIMUM MONTHLY SALARIES OF HIGHWAY PERSONNEL

										MAIN	ITENA	NCE	P	ERSON	NEL							OTHER	KEY	PERSO	NNEL
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apply to all jobs. Consider, for example, the job of mechanic. This job definition is readily understood and, in the opinion of the Committee, the job content does not vary greatly throughout the country. Yet the average salary of a mechanic as of July 1, 1948, varied from \$160.58 to \$332.80 per month. The average monthly salary of skilled labor varied from \$113.63 to \$277.00, and common labor from \$107.25 to \$230.00. The salary of state maintenance engineers varied from \$370.00 to \$1,045.00 per month

The Maintenance Personnel Committee does not believe that these wide variations in salary and wage are due entirely to variations in territorial costs of living and job content. The Committee believes that an extensive job analysis and evaluation study should be made to establish salaries and wages that are relatively fair within and without the highway organization. The Committee further believes that a basic job-evaluation plan should be developed by an independent group such as the Highway Research Board or the Public Roads Administration from a study of the job content of a few key jobs in several state highway departments. The key jobs to be studied and properly related should be not only from the highway maintenance group but from all job groups in the state highway organization.

Advancement, Retirement Plans, Etc.

The other three factors which employees selected in the survey made by National Industrial Conference Board are not subject to accurate measurement. Opportunities for advancement are present in the highway maintenance field as well as in all industry. The type of work preferred by the employee depends on the temperament and the preference of the individual. The fourth item, the practice of informing the employee of his job status, is one which is probably not given due weight by most employers. It should be brought out in highway-department supervisory

A well organized retirement plan is another factor which affects the economic benefits accruing to the employee. Of the 48 states, 32 report that their highway maintenance employees are included in a retirement plan. In industry, such plans are not prevalent except in larger companies. These employees are, however, generally included under Social Security.

Vacation with pay is also a job benefit that is highly valued by the em-Twenty-two states report that all employees receive some annual va-cation with full pay. The remaining 26 states give vacations with pay to certain employees, usually the salaried group The length of the annual vacation given by state highway departments varies from 10 to 20 working days per year. In industry the general practice is to give one week's annual paid vacation after one year's employment and usually two weeks after five years' service.

The highway maintenance employee has an advantage over the average industrial employee in the matter of sick leave. Forty-five states provide 10 or more days of paid sick leave each year, one state grants "discretionary" sick leave, and the other two grant none. In industry, only 14 per cent of the companies allow sick leave as a routine procedure.

There are other job benefits which contribute to the well-being of the average industrial worker, such as group life insurance paid in part by the em ployer; annual wage guarantees; profit sharing and stock bonus plans; company stores and co-ops; non-production bo nuses; etc. Many of these job benefits are not applicable to the highway maintenance industry, the Committee points out, but they should all be studied in an effort to make employment in the highway maintenance field as attractive as

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in any other industry in the nation.

Titles of Maintenance Employees

The Committee also sets forth in its 1948 report the following definitions of titles held by maintenance employees. The definitions refer to the first subdivision in the state for supervision purposes as a "division"; to the second subdivision as a "district".

State Maintenance Engineer: One in an executive capacity who supervises the activities of the maintenance bureau of the state highway department.

Assistant Maintenance Engineer: One who assists the State Maintenance Engineer in the work of supervising the activities of the maintenance bureau.

Division Engineer: One in an executive capacity who supervises all high-way activities within a division, including maintenance.

Division Maintenance Engineer: One who supervises the maintenance of highways within a division, which usually comprises from 1,000 to 2,000 miles of highway.

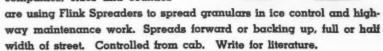
Assistant Division Maintenance Engineer: One who assists the Division Maintenance Engineer in supervising maintenance operations in the division

District Maintenance Engineer, District Foreman: One who directs the activities of all maintenance employees (Concluded on next page)

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Unquestionably the finest hydraulic spreader.

Hundreds more transportation companies, cities and counties



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FLINK CO. Dept. S-5 Streator, Ill.



PERFORMANCE . . . By the use of this accurate yardstick year after year and under extremely severe working conditions of all kinds-Preformed "HERCULES" (Red Strand) has become recognized as "the Dependable Wire Rope for Any Tough Job". For over 60 years the "Red-Strand" has been a reliable guide to safe and economical wire rope service.

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LOS ANGELES 21

(Red-Strand) Wire Rope for your

CHICAGO 7 SAN FRANCISCO 7 HOUSTON 3

DENVER 2

Salary, Job Benefits For Maintenance Men

(Continued from preceding page)

and oversees the maintenance of highways within a district usually compris-ing a highway mileage of from 200 to 800 miles

Garage or Shop Foreman: One who is responsible for the operation of a garage and the supervision of the main-tenance and repair of equipment.

Gang Foreman: One who directs the activity of a group of men engaged in special maintenance and betterment work, such as a grading crew, bituminous-repair crew, concrete-pavement-patching crew, bridge-repair crew, patching crew, bridge-repair crew, center-line-marking crew, roadside-maintenance crew, etc.

Sectionman: One who in reality is a working foreman, who can and does do any of the work necessary to maintain properly the highways within a speci-fied territory, usually comprising from 25 to 75 miles, and in addition super-vises the work of operators and laborers when necessary. A highly skilled and trained man.

Mechanic: One who repairs, and supervises helpers in repairing, all types of equipment.

Equipment Operator: One who operates motorized equipment (excepting trucks) used in maintenance and betterment work.

Mechanic Helper: One who assists the Mechanic in the repair of all types of equipment and does certain mechanical work under direct supervision.

Clerk or Timekeeper: One who keeps the time records of employees; hours of equipment usage; quantities of materials received, used, and on hand; maintenance cost records, etc.

Skilled Laborer: One who through special training or experience has become proficient in such a trade as carpenter, painter, mason, plumber, or such work as patrolman helper, bridgerepair man, truck driver, etc.

Common Laborer: One who performs manual labor.

Titles of Other Personnel

Finally, the Committee sets forth the following definitions of titles for key personnel other than maintenance. Project Engineer: One who has

charge in the field of one or more highway construction projects, under the general supervision of a Division Construction Engineer and/or a Division

Chief of Survey Party: One who has charge in the field of a highway survey party, with some latitude for exercising individual judgement but under the general supervision of an Assistant Division Engineer and/or a Division Engineer.

Plans Designer: One who designs highway construction plans, such laying grade line, preparing intersection layouts, determining sizes and lengths of drainage structures except bridges, preparing construction estimates, etc. under the direct supervision of a Chief Designer.

Bridge Designer: One who designs highway bridges under the direct su-pervision of a Chief Bridge Designer.

Chief Clerk: One who has a knowledge of modern office methods, procedures, and equipment; business arithmetic and business English-and who supervises a large group of clerical employees engaged in performing important clerical work.

Members of Committee

The Joint Maintenance Personnel Committee has as its Chairman Rex M. Whitton, Engineer of Maintenance, Missouri State Highway Department. Its members are: J. S. Bright, Public Roads Administration; E. A. Collier, Maintenance Engineer, Oregon State Highway Commission; B. W. Davis, State Maintenance and Equipment En-

gineer, North Carolina State Highway and Public Works Commission; G. B. Finley, Maintenance Engineer, Texas Highway Department; W. Hoenig, Maintenance Engineer, Wisconsin Highway Department; L. F. Johnson, Wisconsin Highway Department Highway Depart tenance Engineer, New Hampshire State Highway Department; R. M. Reindollar, Chairman, Maryland State Roads Commission; Ray Robinson, Maintenance Engineer, North Dakota Department of State Highways; D. N. Stewart, Superintendent of Maintenance, Colorado State Highway Department; and C. C. White, Maintenance Engineer, Arkansas State Highway Commission.

Data on Form Engineering

A revised edition of its form-engineering catalog has been released by the Williams Form Engineering Corp., 925, Madison Square Station, Grand Rapids 7, Mich. Among the contents of this 52-page catalog are tables for determining the most eco-nomical design of forms using the Williams Super-Hi tensile form clamps; diagrams and tables for use in the design of reinforced retaining walls; a table of the weights of clamp parts and form hardware; tables of joist and stud spacing for various loads; and a table for computing allowable load per linear

foot for No. 2 yellow pine.

New concrete-form hardware not previously listed in the Williams catalog includes a form aligner and a com-bination bolt clamp. The catalog describes new forming methods for pouring dams in high vertical lifts. It also contains a list of selected references on almost any concrete-form question. In addition to a general index, a special index lists various projects and tells where information on the equipment for each of these projects is located in the catalog.

Copies of this literature may be obSi

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tained from the company. Or use the enclosed Request Card. Circle No. 70.

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SANTA FE DAM, CALIF. Grading a haul road for heavy trucks on top of the dam, the No. 12 leaves a th surface in rocky

BALTIMORE, MARYLAND Setting the pace for the paver, the No. 12 moves



BERTHOUD PASS, COLO. 8000 feet up! This new road requires fine, accurate finishing. The No. 12 "can do" within ¼ inch.





Size, Weight Restrictions For Trucks and Trailers

Data on size and weight restrictions for trucks and trailers are condensed in the 1949 edition of the annual booklet prepared by The Four Wheel Drive Auto Co., Clintonville, Wis. This report contains up-to-the-minute information on the restrictions established by the governing authorities in each of the 48 states, and is of special value to operators who deal in interstate commerce, or whose vehicles are required to cross state lines for any reason.

Each page of this pocket-size manual

covers the regulations of a different

state concerning width, height, length, axle spacing, wheel loadings, speed laws, etc. The rules as set forth for each state are carried over the signature of an official of that state.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 41.

Concrete Belt Conveyor

Belt conveyors especially designed to speed the placement of concrete are described in a one-page catalog sheet prepared by the American Conveyor Co., 1115 W. Adams St., Chicago 7, Ill. The catalog sheet stresses the features

of the Con-Vay-It Special-fast pouring, saving in man-power, rapid spotting of concrete in hard-to-get-at places, and adaptability for use with other materials.

Specifications listed for the Con-Vay-It cover the belt, electric or gasoline engine power unit, drive, bearings, frame, self-scrapers, undercarriage and pneumatic tires, hopper, baffle. other details of construction. The sheet also covers the company's guarantee, and shows several illustrations of the concrete conveyor in use.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 57.

Automatic Line Oiler Protects Rock Drills

line-oiler mechanism to protect rock drills or other air-actuated equip-ment from running without sufficient lubrication has been developed by the Gardner-Denver Co., 102 Williamson St., Quincy, Ill. The LO12 automatic line oiler is designed to shut off the line air when all the oil in the reservoir has been used.

In operation, the LO12 oiler delivers a metered flow of atomized oil from any position, either vertical or horizontal, until all of the oil is consumed. It has an oil capacity of one pint and, according to the manufacturer, will meter the flow of oil so that any pneumatic equipment using from 25 to 500 cfm of air can be efficiently lubricated. The unit can be filled while the machine to which it is attached is running. The manufacturer also points out that it is impossible for oil in the chamber to become emulsified and mixed with water. To simplify servicing, all parts may be withdrawn by hand once the bushing on the inlet end has been removed.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 33.

Welding Rods, Accessories

Electrodes and arc-welding accessories are described in two catalogs issued by the Hobart Bros. Co., Hobart Square, Troy, Ohio. Catalog EW-124 lists a complete line of accessories including face shields, grinding shields, electrode holders, ground clamps, weldcleaning tools, cable connectors, flexible welding cable, 3-conductor cable, cable spicers, lugs and connectors, carbonelectrode holders, a carbon-arc torch, carbon plates, work holders, plugs and receptacles, and other miscellaneous items. Also listed is a series of information guides, texts, and manuals on welding prepared for distribution by Hobart.

Catalog EW-125 lists more than 22 major types of Hobart electrodes. 28-page pocket-size catalog gives the style number of each electrode, describes the uses for which it is best adapted, and tells how to use it. It lists principal physical properties of each electrode, the lengths and diameters in which each is sold, and the recommended voltage and type of current for use with each.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. For Catalog EW-124, circle No. 75; for Catalog EW-125, circle No. 76.

Decals for Identification

Decalcomanias for equipment identification are the subject of a release prepared for distribution by The Palm Bros. Decalcomania Co., 3732 Regent Ave., Cincinnati 12, Ohio. The release consists of two descriptive catalogs contained in a standard-size manila folder.

One catalog, a 4-color 4-page folder, describes the features of design, application, cost, and durability claimed for decals, and reproduces several designs prepared by the company for use by various business concerns. The other is a 12-page catalog which stresses the applications of decals and includes several samples of them.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 7.

Technician for Marguette

Charles E. Wuerpel has joined the Marquette Cement Mfg. Co. in the capacity of Technical Director. He will be located at the company's general offices in Chicago. Mr. Wuerpel was formerly Chief of the Concrete Research Division of the Corps of Engineers, U. S. Army.

motor graders

ALL YEAR AROUND, on hundreds of construction and highway jobs, you'll see these husky one-man "Caterpillar" Diesel Motor Graders tackling a wide range of tasks. In scorching heat and bitter cold, they have the rugged stamina for heavy grading, as well as the accuracy for fine finishing. Designed and built entirely by one manufacturer, they're all "Caterpillar"-front axle to radiator cap. And they're sold and serviced by one reliable, well-equipped dealer. The advantage is all yours with these hard-working money makers in your line-up.

CATERPILLAR TRACTOR CO. . PEORIA, ILLINOIS





GRAND COULEE DAM, WASHINGTON

Relocating a highway calls for banksloping, ditching, grading. That's duck soup for the No. 12.

IDAHO FALLS, IDAHO

150 miles of Bonneville County road to keep clear. upped with V-type snow and wing, the No. 12 the job.



CENTRAL VALLEY, TRACY, CALIF.

versatile No. 12, bes maintaining haul ds, is also used for roads, is also used smoothing canal bed aho of a Monighan.



WASHINGTON COUNTY, COLORADO

A No. 12 widens and re-builds as much as one mile



DIESEL

ENGINES . TRACTORS . MOTOR GRADERS EARTHMOVING EQUIPMENT

Airport Improvement On Taxiways, Apron

Razing Hill Gives Better Sight Distances Around Field; Washouts by Rain Cause Contractor Trouble

THE Muscogee County Airport at Columbus, Ga., has been improved under a \$172,750.58 contract by the Wright Contracting Co. of that city. Work started in the autumn of 1947, and was completed last July. Under the contract, taxiways were constructed, the paved apron was extended, a hill was leveled to provide better sight distances, existing storm-drainage facil-ities were revised, and new drainage facilities were installed.

The county airport is located about 5 miles northeast of Columbus off State Route 85, and was built with two runways intersecting each other to form the letter X. A northeast-southwest runway is 3,800 feet, and a northwest-southeast runway is 4,000 feet long. Both have plant-mix paving 150 feet wide. The same material was used in the construction of the original apron

which measured 50 x 250 feet.

This apron was enlarged under the Wright contract to 180 x 400 feet in order to accommodate the larger planes expected to use the improved Taxiways—there were none before— now connect the runways to the apron. Their combined length totals 11,550 feet, and they have a uniform width of 50 feet. Future expansion calls for an additional 11/4 miles of taxiways to give a complete circuit of the airport.

Grading the Field

Slightly more than 100 acres was added to the area of the field in the grading operations necessary to the new taxiways, which are located about 300 feet off the runways. All material for the fills was taken from within the boundaries of the airport. A prominence which was leveled at the northwest corner of the site provided a good portion of the earth work. The unclassified excavation, which was chiefly sand-clay, totaled around 175,000 cubic yards. The deepest cut was 21 feet, and the highest fill was 16 feet.

WHY PAY SIX TIMES MORE FOR YOUR BREAKING?



THE MIGHTY MIDGET

Shown breaking out 8500 square feet of platform supported by heavily reinforced concrete beams 12" x 14". Machine readily demolished slab and beam together, breaking out an approximate 6000 square feet in six hours time, powered by 160' compressor. Total thickness where beam intersected.

Ask your dealer or write for information.

R.P.B. CORPORATION 1751 EAST 11th STREET - LOS ANGELES, CALIFORNIA

For dirt-moving the contractor used x LeTourneau 12-yard Carryalls pulled by Caterpillar D8 tractors, and six LaPlant-Choate 12-yard scrapers pulled by Caterpillar DW10 rubbertired tractors. Six other D8 tractordozers and an International TD-14 dozer were on the job, and used for either push-loading the scrapers or spreading the dumped material over the fills in 6-inch lifts. Maximum haul distances with the crawler-tractor units was 750 feet, and 1,200 feet with the rubber-tired tractors.

The subgrade was compacted to 95 per cent density at optimum moisture by LaPlant-Choate sheepsfoot rollers. Three tank trucks, each holding 1,200 gallons and equipped with spraybars at the rear, furnished the necessary



C. & E. M. Photo
On the Wright Contracting Co. job at Muscogee County Airport in Georgia, a tractordozer fills in a hole 60 feet long, 26 feet deep, and 30 feet wide, at the southeast end
of the northwest-southeast runway.

water which was pumped from a nearby creek by a Jaeger 2-inch pump.

Drainage

In extending and adding to the field

drainage system, 37 drop inlets with frame and grate were installed, together with over 9,000 linear feet of reinforcedconcrete storm pipe from 15 to 42-inch (Continued on next page)

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BE SURE THAT ADJUSTABLE STEEL SHORES and COLUMN CLAMPS ARE USED ON YOUR NEXT CONTRACT NICKERBOCKER CONCRETE ARCH CONSTRUCTION CO 10 BOCKEFELLER PLAZA NEW YORK 20, N Y ing your skeros adjus he past several months and here found them to be superior thing we have used in the past. Our superintendent and the carpenters who handle these res tall us that they prefer to use this type of shore se they are all in one piece, have no loose parts to get lost, require no jacking, and are well balanced. We think so much of this type of shore, that we have sold all of our other types and will stands Rg Ochiebu ACROW Column Clams TIME SAVING and ECONOMICAL

Write for leaflets on Acrow Products as indicated:

☐ Acrow Adjustable Steel Shores
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☐ Acrow Adjustable Steel Scaffold_Stands

☐ Acrow Steel Road and Runway Forms
☐ Acrow Tubular Scaffolding

420 Lexington Avenue

Acrow Steel Shores and Column

Clamps are immediately available on sale or rental, with option to pur-chase. Shore rental—50c per shore,





diameter. The pipe was supplied by the Camp Concrete Products Co. and Con-solidated Gravel Co., both of Columbus, Ga. Trenches for the pipe were excavated by a Link-Belt dragline with a 60-foot boom and using either a Yaun 1-yard or a Page ¾-yard drag bucket. The average depth of trench was 8½ feet. The crane was also used to set the pipe. The general drainage direction of the field is to the southeast.

Practically all the drainage and about 80 per cent of the grading was com-pleted between October, 1947, and the middle of January, 1948, when the job had to be shut down because of bad weather. The cold weather of last winter and the unusual amount of rainfall prevented the contractor from resuming work in the spring until April 15. Then considerable time and equipment had to be devoted to restoring to the field the material that had been washed away by the excessive rains.

On the northwest-southeast runway seven large washout holes had developed, while on the northeast-southwest runway four gullies of similar size had sloughed out of the fill. The longest of these gullies was about 150 feet long and 30 feet wide and deep. The washout holes were not quite as long but their other dimensions were comparable. New material was hauled in by the LaPlant-Choate scrapers pulled by the Caterpillar DW10's and spread over the washed-out area by a Bucyrus-Erie 12-foot dozer blade mounted on the TD-14 tractor.

Pavement on Sand-Clay Base

The paved areas of the contract are supported on a 12-inch sand-clay base course which is 52 feet wide on the taxiways. The material came from a borrow pit on the airport property, the work on this phase of the project get-ting started the middle of May, 1948. While the rest of the field is also composed of sand-clay, the material from the borrow pit contained a good proportion of topsoil that helped bind the base course more closely together.

An Insley 34-yard shovel worked the borrow pit, and six 4-yard trucks, hired by the hour, hauled the material and dumped it on the taxiways. There it was spread in three 4-inch lifts by dozers, and compacted to 95 per cent density at optimum moisture by a LaPlant-Choate sheepsfoot roller pulled by an International ID-9 rubber-tired tractor, and by a Bros rubber-tired roller pulled by an International ID-6 rubber-tired tractor. Water was added from the tank trucks when necessary, to get the proper compaction. A Caterpillar No. 12 motor grader did the final shaping, putting a 3-inch crown on the taxiways.

The base course was next primed with RT-2 tar at the rate of 0.25 gallon to the square yard. It was put on by an Etnyre 1,200-gallon distributor mounted on a Mack truck. Sam Finley of Atlanta, Ga., was the subcontractor on the bituminous-paving work. Bitumen was furnished by the Mexican Petroleum Corp.

Plant-mix for the 2-inch course of black-top came from the Finley commercial plant that supplies Columbus and the vicinity with asphaltic concrete. The average haul out to the job was 3 miles. Barber-Greene Finishers laid the mix which was rolled by 10-ton

tandem rollers. As a final touch, the plant-mix was given a bituminous seal coat of RC-2 asphalt. This was covered with a light blotter spreading of sand.

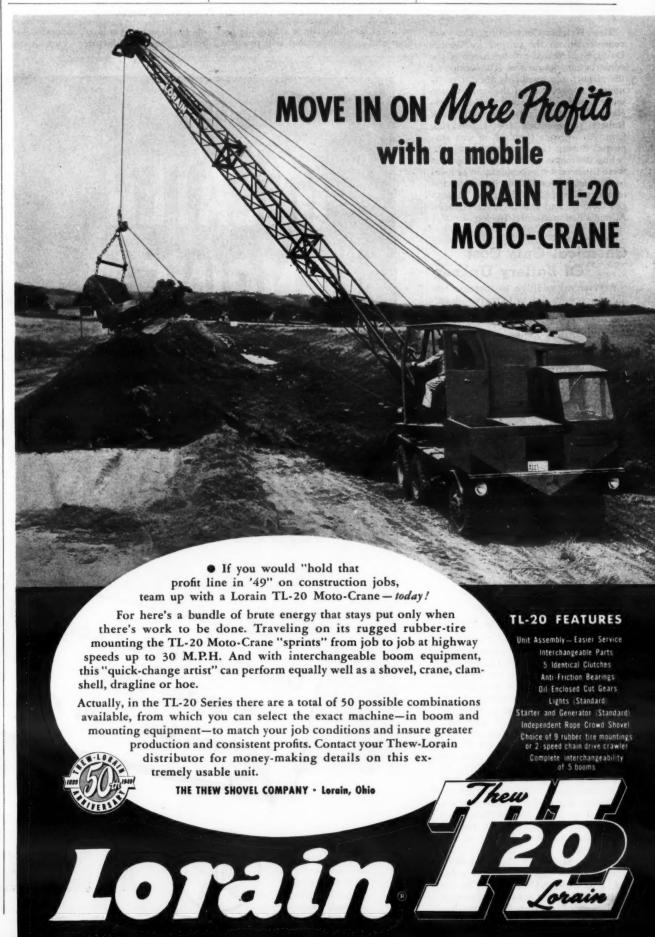
The unpaved areas that were graded, totaling around 102 acres, were turfed with a seed mixture consisting of three

At left, a D8 pusher helps load a LaPlant-Choate 12-yard scraper pulled by a Caterpillar DW-10 tractor during dirt-moving operations at Muscogee County Airport, Columbus, Ga.

Above, the same rig is unloaded, while an International TD-14 tractor with a Buoyrus-Erie 12-foot dozer waits to push the material into a washout hole caused by heavy

bushels of oats, 50 pounds of Lespedeza sericea and 5 pounds of Bermuda grass The ground was first the acre.

scarified and harrowed, then prepared with 1,200 pounds of lime and 300 (Concluded on next page)



Airport Improvement On Taxiways, Apron

(Continued from preceding page)

pounds of 4-8-4 fertilizer before the seed was sown.

During all the construction operations when equipment was crossing the airport runways, flagmen were on duty to keep the runways open for the ships of the Delta and Eastern Air Lines using the field.

Quantities and Personnel

The major items in the Muscogee County Airport improvement contract included the following:

Unclassified excavation	175,000	cu. yds.
Reinforced-concrete pipe storm drain, 15 to 42-inch	9,084	lin. ft.
Sand-clay base course	11,640	cu. yds.
Bituminous prime coat	17,475	gals.
Bituminous surface course, 2-inch	,	
plant-mix	4.993	tons
Bituminous seal coat	9,986	gals.
Cover aggregate for seal coat		tons
Turing		acres

The Wright Contracting Co. was represented on the project by George Davis, Superintendent, in charge of the construction operations. The design of the airport improvements and the engineering supervision of the construction were handled by Robert & Co., Associates, Inc., of Atlanta, Ga., with Jack Robert representing the engineering firm. An average force of 50 was employed during the construction.

Improvements to the Class 3 airport were financed by a combination of local funds and Federal Aid, involving the municipality of Columbus, Ga., Muscogee County, and the Civil Aeronautics Administration, Second Region.

Chemical Cuts Cost Of Battery Upkeep

A chemical additive to increase the life of new batteries, or to revive "dead" ones, is produced by Pioneers, Inc., Dept. 2, 2411 Grove St., Oakland 12, Calif. According to the manufacturer, approximately 30 per cent of all battery failures are mechanical; the other 70 per cent are caused by "sulfation". The AD-X2 chemical is designed to combat the harmful effects of this sulfation.

Sulfation is described as the formation of hardened sulfate in a cell of the battery; this coats the grids and the active material of the plates, and prevents the free flow of electrical energy. The AD-X2 chemical is designed to lessen the sulfation, and to convert the hardened sulfate into a material which will form a firm contact with the grid. Its action keeps the resistance of the battery low, says the manufacturer, and the porosity of the plates high.

Further information may be secured from the company, or by using the en-closed Request Card. Circle No. 74.

Concrete Plant Gets New Auxiliary Hoist

An auxiliary hoist unit has been added to the portable concrete plant made by the Erie Steel Construction Co., 287 Geist Road, Erie, Pa. The hoist is hydraulically operated and is controlled by the plant operator. It will increase the output of the Erie Strayer by as much as 25 per cent, according to the manufacturer.

The hoist raises and lowers a concrete bucket which takes a complete batch from the plant; this permits the next batch to be cycled with little delay. Moreover, the manufacturer points out, each batch of concrete can be raised to any desired height. A swivel chute rotating through 180 degrees adds further flexibility to the discharge point.

The Erie Strayer portable plant is made in three sizes—¾, and 1 cubic yard. It is designed for towing to the job site and features one-man operation
—exclusive of cement handling—low



The auxiliary hydraulic hoist unit which has been added to the Erie Strayer portable concrete plant is designed to increase output 25 per cent and permits each batch of

cost, and flexibility. It is adaptable for | up to 40 cubic yards of concrete per large and small jobs, and will produce

hour, the manufacturer

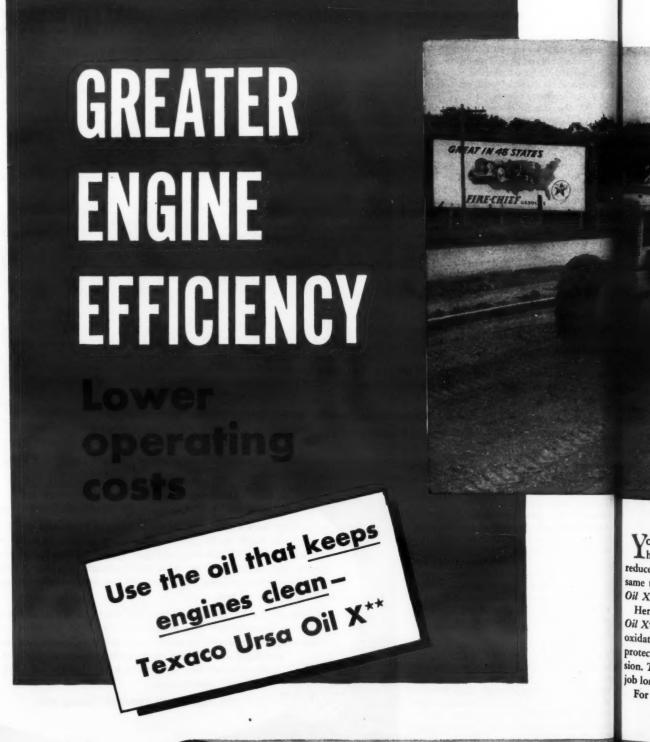
transit, it is 8 feet wide, 12 feet 6 inches high, and 28 feet 734 inches long. It has an approximate weight of 24,000

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 60.

Hawkins Upped by Osgood

The Osgood Co. and The General Excavator Co. have announced the appointment of William S. Hawkins as Division Sales Manager for the states of Texas, Oklahoma, Kansas, Missouri, Iowa, and part of Nebraska. He will make his headquarters at Topeka, Kans.
Distributors with whom Mr. Hawkins

will work in this area include Stephens-Jones, Inc., Des Moines and Sioux City, Iowa; Clem Fleury Equipment Co., Cedar Rapids, Iowa; Hennessey-For-restal Machinery Co., St. Louis, Mo.; Martin Tractor Co., Inc., Topeka, Kans.; Jack Spratt Road Machinery Co., Wich-ita, Kans.; and the G. A. Coffey Co., Dallas, Texas.



TEXACO STAR THEATRE ents MILTON BERLE very Wednesday night METROPOLITAN OPERA

Saturday afternoon



Her

For

Cradle-Boom Hoist Has 3-Ton Capacity

A utility yard crane for general duty is available from the Construction Machinery Co. of Waterloo, Iowa. Of the cradle-boom type, it will lift loads of up to 3 tons in weight, depending on weight of prime mover. It is especially recommended by the company for loading or unloading operations, for spotting materials, and for shifting them from one location to another.

The Handi-Hoist can be used with a Jeep or with a light-duty tractor. Power for operation is obtained from a power take-off connected to the prime mover. The Handi-Hoist has a clearance of 9 feet when lowered, and can be raised to a height of 15 feet.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 62.

Oakite Appoints Oldroyd

The appointment of Frank L. Oldroyd



The cradle-boom Handi-Hoist can lift loads up to 3 tons in weight.

as Sales Manager of its Industrial Division is announced by Oakite Products, Inc., manufacturer of a line of industrial cleaning materials and equipment, and allied products. He will be located at the New York City offices.



Vou'll get more power, more efficiency, out of your heavy-duty gasoline and Diesel engines . . . and reduce your maintenance and operating costs at the same time . . . when you lubricate with Texaco Ursa Oil X**.

Here's an oil that keeps engines clean! Texaco Ursa Oil X** is fully detergent, dispersive and resistant to oxidation. It keeps rings free and valves active . . . protects parts against wear and bearings against corrosion. Texaco Ursa Oil X** keeps your engines on the job longer between overhauls . . . keeps fuel costs low.

For chassis parts of trucks, tractors, shovels and

other equipment, lubricate with Texaco Marfak. It lasts longer, protects parts better. In wheel bearings, use Texaco Marfak Heavy Duty to seal out dirt and moisture, give full protection. Lubricate crawler track mechanisms with effective Texaco Track Roll Lubricant.

Texaco has lubricants for all your needs. Use the Texaco Simplified Lubrication Plan. It assures both economy and improved performance. Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, New York.

Lubricants and Fuels FOR ALL CONTRACTORS' EQUIPMENT

Grading, Drainage For Express Route

(Continued from page 1)

County Participation

Cook County acquired the right-ofway for the project which has a minimum width of 300 feet; around the grade-separation structures, of course, the width is much greater. The County also took the lead when, in the summer of 1946, it began the construction of eight bridges on the highway, which have since been completed. Last year the Illinois Division of Highways awarded contracts for additional structures, bringing to 14 the total number of highway, river, and railroad gradeseparation bridges on the 9-mile route.

These structures are listed below, beginning at the north end of the project and continuing to the south and east:

Location	Approximate Contract Price
Dolton Ave.	\$243,000
Sibley Blvd.	230,805
Michigan City Road	208,000
154th St.	202,659
Greenwood Ave., Penn RR	323,791
Little Calumet River	360,899
159th St.	259,888
167th St.	102,754
Thorn Creek, west	141,353
Thorn Creek, east	114,908
Torrence Ave.	319,000
Penn RR	480,028
Burnham Ave.	208,308
Wentworth Ave.	310,000

Another structure will be required at the beginning or north end of the Calumet Super Highway where Doty Avenue, or U. S. 30, now dead-ends at 130th Street. Directly south of 130th Street the new alignment is crossed by a track of the Kensington & Eastern Railroad. Tentative plans are for two structures at these crossings, one to carry the railroad over the new highway and the other to carry 130th Street over the new highway.

Modern Design

The new expressway sections will have two 36-foot pavements south to 142nd Street and 24-foot pavements from that point south. They will be separated by a parkway median strip. This median strip is carried through 9 feet 8 inches and variable widths on the bridges, while on the roadway it has a minimum width of 16 feet. It is depressed to the center on slopes of % inch to the foot. The 10-inch reinforced-concrete pavements will have curbs and gutters along both sides. The bridges have all been designed to carry two 36-foot roadways, should this extra lane be required to meet the demands of future traffic.

Provisions to accommodate future traffic lanes have also been made in the roadway design and construction by grading 27-foot strips on each side of the 24-foot pavements. Beyond these strips are planted areas of variable width with 3 to 1 slopes. Flanking the landscaped borders there may be marginal or local 24-foot roads with 10-foot shoulders, which will carry traffic to the grade-separation structures where access to the expressway is provided by 17-foot single-lane ramps.

17-foot single-lane ramps.

No paving will be done until some time this year, thus permitting the fill sections to settle for several months. The total project will cost around \$14,-000,000, with approximately \$6,000,000 of this going for the various bridge structures, grading, and drainage work, and the remaining \$8,000,000 required for the paving contracts.

In order to expedite the work, separate contracts for grading and drainage were awarded over various sections of the big project. This stimulated interest among contractors specializing in different types of construction. Keeping the sections fairly short in length enabled the separate contractors to finish their portions of the work in good time.

Typical Drainage Contract

A typical drainage contract on the (Continued on next page)

Grading, Drainage For Express Route

(Continued from preceding page)

project was the one awarded to Louis Scully & Sons of Chicago for section 0507-T, extending 1.8 miles along the Calumet Super Highway. The northern end of the contract began near the Grand Calumet River and continued south to a point 1,146 feet south of 154th Street. The major item in the contract was the placing of 21,508 linear feet of storm sewer from 10 to 96 inches in The bid amount was \$513,diameter. 553.94. Reinforced-concrete pipe was used for the sewers, and was delivered the job by trailer-truck haul from Chicago. It was furnished by Lock Joint Pipe Co. of Chicago; Independent Concrete Pipe Corp. of Lockport, Ill.; and Young & Greenawalt Co., East Chicago,

The pipe was laid 9 feet off the center line of the median strip in a trench with a maximum depth of 24 feet. As there was ample room for excavation on an unobstructed right-of-way, the trench slopes were laid back and shoring was usually eliminated. The upper 10 to 15 feet of digging was usually in sand. This was removed by a P&H Model 700 11/2yard trench hoe which made a windrow of the excavated material along each side of the trench at the extreme reach of its bucket. This was not out beyond the line of cut, however, so the sand was pushed farther back by a Caterpillar D7 tractor-dozer. The rest of the digging through clay was handled by a P&H Model 600 crane with a 40-foot boom and a %-yard clamshell bucket. Only about 100 feet of trench was

opened at a time, and the hole was kept dry with a couple of 4-inch diaphragm pumps. The trench was benched along the side, and from this level the pipe was set by a Link-Belt Speeder crane with a 55-foot boom. A layer of sand was spread over the bottom of the trench to make a level foundation for setting the pipe. A bolt through a hole in the pipe was secured to the crane cable for lowering the sections into the trench. A 66-inch pipe section, 6 feet long, weighs 4½ tons. The trucks carried three such sections at a time.

The joints of the pipe were closed with a sand-cement mortar, and then wrapped with an 18-inch-wide strip of burlap. The trench was backfilled with sand to the top of the pipe at least, and

This shows the location of the Illinois section of the proposed Chicago-Detroit

then with clay for the rest of the cut which, at the top, was as much as 100 feet in width. The backfill was compacted by the D7 tractor, to be followed by inundation. This Scully contract was completed during the 1948 construction

season, as was another drainage contract on the Tri-State Highway

Typical Grading Contract

Various grading contracts cover nearly the entire 9 miles of express highway. A typical grading contract was the one awarded to the Thomas McQueen Co. of Forest Park, Ill., on a low bid of \$479,793.99. This covered three sections -2525A, 2626A, and 2626.2A. It extended east for a total length of 1.35 miles on the Tri-State Highway, from a point 1,300 feet east of Torrence Avenue to the Indiana state line. The major item in this contract was for 366,579 cubic yards of embankment.

Very little cut was required either in this contract or over the entire project, as most of the roadway is built up on an embankment fill. The fills ranged in height from nothing up to 28 feet at the bridges. Cut excavation was chiefly in the ditches. Material for the embankments came from borrow pits, usually either marginal farm lands or littleused areas along the flat banks of the

Calumet River. For this contract the Thomas McQueen Co. acquired one large borrow pit of 80 acres which provided all the material required for the fills. The pit yielded a moist, loamy clay which was removed in some portions of the area to a depth of 10 feet. Ar-rangements were made for the original owner to reacquire the site after the pit had served its purpose.

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A Bucyrus-Erie 21/2-yard dragline with a 60-foot boom dug material from the pit. It loaded eight International 7 to 10-yard trucks which made an average haul of 1½ miles to the contract. For short hauls of from 500 to 1,000 feet along the roadway, tractor - scraper units were employed. The latter included three LeTourneau 12-yard Carryalls pulled by D8 tractors; two Gar Wood 15-yard scrapers with D8's, and a third Gar Wood 15-yard machine with an Allis-Chalmers HD-19 tractor; a Continental 12-yard and a Wooldridge 18-yard scraper, each pulled by an International TD-24 tractor.

(Concluded on next page)



"SPLENDID PERFORMANCE"

Blue Brute team-mates three of a battery of WJ-45 Rock Drills, powered by Portable Air Compressors used by the Del R. Beebe Construction Co. of ne, Oregon, excavati for a big housing project's sewerage system. The Beebe Co. reports"splendid performance" in every detail of Blue Brute operation.

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REPORT FROM OHIO: "VERY MUCH PLEASED"

A Blue Brute construction team in Toledo, Ohio, removing street paving. Owner John V. Rush of Toledo says: "Our WB-85 Paving Breakers and 60' Portable Compressors make ideal combinations. In four months' continuous operation, removing and replacing 6" and 8" concrete base, we have had absolutely no maintenance trouble on this equipment. We are very much pleased with it."

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before. That's because these Worthington air tools not only hit harder and last longer — they have the lightness, compactness and precision balance that means easier handling . . . faster, smoother progress . . . hours and dollars saved on every job.

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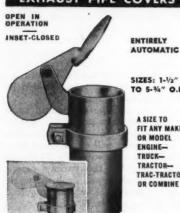
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The material was spread in 6-inch lifts by a couple of D8 dozers, broken up by disk harrows when necessary, and compacted by sheepsfoot rollers to 90 per cent of maximum density at optimum moisture. Because of the moist condition of the borrow pit, additional water seldom had to be added. Final shaping of the grade was done by a pair of Caterpillar No. 12 motor graders. An average of 4,500 cubic yards of material was moved in a 9-hour day.

Personnel

Both the drainage and grading contracts outlined above were awarded by the Illinois Division of Highways, which supervised the construction. sion is headed by W. W. Polk, Chief Highway Engineer, with C. M. Hatha-way, Engineer of Construction. The expressway project is located in the Tenth District of which C. H. Apple is District Engineer with headquarters in Chicago. Frank Drasda is Resident Engineer on the project contracts.

Pat Scully was Superintendent on the Louis Scully & Sons contract for the drainage work, while Ernest Sporry was Superintendent for the grading contract of the Thomas McQueen Co.

Indiana Side of the Line

The Indiana State Highway Commission has also begun work on the Tri-State Highway. It has awarded a grading contract to J. C. O'Connor & Sons for a short stretch between Jackson and Delmar Avenues in Hammond, Ind., near the Illinois state line. The contract amount is \$590,335. Another contract to provide for a grade separation at U. S. 41 and the Tri-State Highway has been awarded. These two contracts will provide the first leg of the Chicago-Detroit limited-access expressway through Indiana.

At present there are four major routes connecting Chicago and Detroit. The shortest of them is 271 miles. That route follows U. S. 112 from Detroit to New Buffalo, Mich., on the shores of Lake Michigan, where it joins U.S. 12 to continue through Indiana to Illinois and Chicago. This route is, like the other three, marked by sharp curves, steep hills, short sight distances, narrow twolane pavements, narrow shoulders, and many intersections at grade with other major highways or railroads. The pavement surfaces on all routes leave much to be desired.

The Indiana section of the expressway will continue from the Illinois line through Lake and Porter Counties for about 181/2 miles until it joins U.S. 20, approximately 2 miles east of the Lake County line. From this junction the expressway will use the existing multiple-lane pavements of U. S. 20 and Indiana 2 until the South Bend-Mishawaka-Elkhart triangle is reached. From there the new route will turn north into Michigan until it reaches the vicinity of Kalamazoo.

Then, turning east, the expressway will follow the general route of U. S. 12 past Battle Creek, Jackson, and Ann





On the Louis Scully & Sons drainage contract south of Michigan City Ave., a Model 700 P&H 1½-yard trench hoe digs a trench for 66-inch Lock Joint concrete pipe.

Arbor, where it will bend to effect a junction with U. S. 112 about 2 miles southwest of Ypsilanti. From there to Detroit, the new route will travel on 30 miles of Willow Run Expressway and Detroit Industrial Expressway to the city limits of Detroit at Wyoming and Michigan Avenues, about 6 miles from the heart of the city. All the important intermediate cities of Indiana and Michigan which are located near this route will be by-passed, but easy access will be furnished to them. In this way the maximum number of people will be served by the new highway.

It is, of course, a free road, but the Highway Departments feel that it will pay for itself from the collection of the gasoline tax. Besides the through traf-fic between the two terminal cities, there is considerable commerce between northern Indiana and southern Michigan cities, which is expected to increase with better highway facilities. No contracts have been awarded as yet on the Michigan portion of the Chicago-Detroit

Expressway.



Anti-Glare Concrete Used on City Street

Colored concrete has been used in the repaving of Adams Street in Newton, Mass. A special type of dispersed black, produced by A. C. Horn Co., Inc., 10th St. and 44th Ave., Long Island City 1, N. Y., was used on the job. It was specified by City Engineer Ashley Q. Robinson, with the approval of Willard Pratt, Director of Public Works for

Among the advantages claimed for the Horn AE dispersed black are that it will eliminate road glare and that it can be used in mortars made with an airentraining cement. According to the manufacturer, this AE dispersed black does not materially alter the effects of the air-entraining agent because it does not absorb the free air in the mortar.

Contractor on the Newton job was the Auburndale Construction Co. of Auburndale, Mass. Ready-mixed concrete, supplied by the Riverside Sand & Gravel Co. of Newton Lower Falls, Mass., was used throughout.

Further information may be secured from the company, or by using the en-closed Request Card. Circle No. 65.

Lubricants for Tractors

Lubricants and oils for tractors, trucks, and power units are listed in a folder prepared by D-A Lubricant Co., 1311 W. 29th St., Indianapolis 8, Indianapolis Ind. This folder lists the grades of greases approved by the various equipment manufacturers. For tractors, it lists the recommended D-A lubricants for the transmission, gear compartments, track rollers, and pressure fit-tings. For trucks, it lists greases for the transmission and differential, axles, and pressure fittings. Recommended grades of lubricants under each of these classifications are listed for extreme heat, summer, winter, and zero weather. Recommended engine oils are listed for extreme heat, and for summer and winter temperatures.

Folder C-101 also lists the various grades of D-A diesel oils, D-A motor oils, and D-A lubricants. It lists the

SAE grade in which each can be supplied, its principal features, consistency and viscosity, and the container sizes in which it is available.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 32.

Worthington Staff Changes

In line with a program to intensify the sale and distribution of its construction equipment, Worthington Pump & Machinery Corp. has made some shifts in personnel. Carl F. Oechsle, Assistant Vice President and Manager of the Construction Equipment Department, will move his headquarters to the company's executive offices at Harrison, N. J.

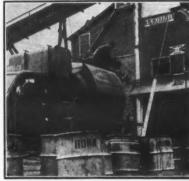
W. J. Fleming, Manager of the Hol-yoke Construction Equipment Sales

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orn AE dispersed carbon black is in-duced into a concrete batch at the ady-miz plant of the Biverside Sand & Gravel Co., Newton Lower Falls, Mass. (above). At right, workmen screed and float the colored concrete



Division, will continue to make his headquarters at Holyoke, Mass., and W. F. Lockhardt, Manager of the Ransome Construction Equipment Sales Di-

vision, will remain at Dunellen, N. J. J. S. Dachman has been appointed to succeed H. C. Sargent as Construction Equipment Regional Supervisor in Washington, D. C., and two other regional supervisors have been named: R. F. Litaker in Atlanta, Ga.; and R. G. Barz in Tulsa, Okla.

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"Fleco" Rock Rakes are easily attached to the modified bulldozer in place of the moldboard. If the blade is detachable from the angling frame or from the push arms, a "Fleco" Rock Rake can be mounted.

Practically all of the dirt passes through the approximately 12-inch spacings between the teeth and a depth of approximately 16 inches can be obtained. Therefore, rocks and boulders can be removed from the soil without an excessive amount of dirt. The length and height of the "Fleco" Rock Rake is approximately the same as the moldboard it replaces.



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Overtime-Pay Ruling; **Effect on Contractors**

Supreme Court Decision In Longshoremen Suits, As It Affects Overtime In Construction Industry

+ OVERTIME-PAY practices in the construction industry have been affected radically by the Supreme Court decision last June in the longshoremen's suits for overtime back wages—the so-called "overtime-on-overtime" cases. The nature and extent of these effects were discussed recently by Harry Weiss, Director, Wage Determinations and Exemptions Branch, Wage and Hour and Public Contracts Divisions, U. S. Department of Labor.

Speaking before the Northern California Chapter of the Associated General Contractors of America, Inc., in San Francisco, Calif., Mr. Weiss begar by reviewing the general wage and overtime provisions of the Wage and Hour Act, with emphasis on the kinds of work it covers and the kinds it does not. He then took up the recent Supreme Court decision in the longshoremen cases, and how it affects the construction industry.

Case of the Longshoremen

The longshore industry, he said, has been characterized by the casual nature of its employment. Because of this, a type of contract developed in that in-dustry which had the purpose, and largely the effect, of establishing a concentration of work within specified clock hours and days, in spite of the number of different employers a man might have during the course of a work week, and in spite of the impossibility of a regular weekly pattern of hours. The longshore contracts made no reference to premium payments for hours in excess of a daily or weekly standard. They merely specified the hours which were to be paid at straight-time rates and the hours during which so-called "overtime" rates were to be paid. Typically, the hours designated as straighttime were the hours between 8 a.m. and 5 p. m. on Monday through Friday, and from 8 a. m. to noon on Saturdays. Work outside these hours or on holidays was to be paid for at premium rates, usually at time and one-half.

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The Supreme Court held that these premium payments, although called "overtime premiums" in the contract, were not "true overtime" at all within the meaning of the Wage and Hour Law. Such higher rates, the Court ruled, must be included in the "regular rate of pay" for the purpose of comovertime compensation puting under the Act for hours worked over 40 in a week.

The Supreme Court went on to define what constitutes "true overtime" under the Act. It held that a true overtime premium is an extra payment, in addition to the regular rate, for working in excess of a bona fide daily or weekly standard number of hours. This true overtime pay need not be included in computing the regular rate of pay and may be offset against any overtime pay required by the Wage and Hour Law.

Decision Applied to Contractors

Before going on to explain the effects of the decision on the construction industry, Mr. Weiss reminded his listeners that there is no problem under it for employers whose employees do not work more than 40 hours a week; nor is there any problem if the employer time and one-half for worked beyond 40 and makes no other types of extra or premium payments in ss of the employee's straight-time rate. It affects only contractors who pay

their employees certain daily premiums for work outside the normal working hours and for work on Saturdays, Sundays, and holidays.

The fundamental problem for such contractors is this: When are premiums paid for work outside the normal working hours to be regarded merely as higher straight-time earnings, and when do they constitute true overtime? When must the premiums be counted in as part of the regular rate of pay, and when can they be credited towards overtime payments which are due under the Act?

The fundamental answer is this: Only when the employee has previously worked a specified number of hours or days, in accordance with a bona fide standard, may these premium payments be considered true overtime payments within the meaning of the Wage and Hour Law. As for the "bona fide standard" number of working hours or days, there is no single and exclusive test for what constitutes it, said Mr. Weiss. It may have been established through collective bargaining, or because of statutory requirements, or as a result of the employer's customary practice.

Thus, if an employer, under a union

contract, makes premium payments to specified standard number of hours—say 8 a day, or 35 a week—these extra payments constitute true overtime premiums. They need not be included in the regular rate of pay, and may be credited towards any overtime pay-ments due under the Act if the 8-hour day or 35-hour week is normally (Continued on next page)

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Overtime-Pay Ruling; Effect on Contractors

(Continued from preceding page)

worked by the employees before they

receive the premium rates.

If the employer's pattern of employment shows that Saturday, Sunday, or night work normally falls within true overtime hours set by contract or practice—that is, after the employees have previously worked the period specified as the bona fide standard—the premium payments for such work may be regarded as true overtime pay for excessive hours of work. This will hold excessive hours of work. This will hold true even though an employee occasionally does not work the full standard number of hours in a particular work week, because of a holiday, an illness, or a similar cause which is normally excused by the employer.

However, if the pattern of employment shows that the employees work sporadically during the week, so that Saturday, Sunday, and night work does not normally fall after the employees have previously worked the standard

have previously worked the standard number of hours, any premiums paid for such work do not count as true

overtime pay.

The Court held that premium payfor work at night, on Saturdays and Sundays, or at other specified hours, as such—in other words, premiums which are paid without regard to the number of hours or days previously worked by the employee—must be included in determining the regular rate. These, the Court stated, are not true overtime payments but are payments for work which must be done at undesirable hours.

Example: Saturday, Sunday Work

Mr. Weiss then discussed separately some of the typical situations in the construction industry which are affected by the Court's decision—beginning with premium payments for work on Saturdays and Sundays.

Say, for example, that a contractor's work week begins on Monday, and his employees normally work a standard work week of 40 hours before working work week of 40 hours before working on Saturdays and Sundays. In such a case, Saturday and Sunday hours would normally fall within the weekly overtime hours set by the contract or by the practice in effect in the contractor's establishment. Therefore, premium payments for these days may be regarded as true overtime pay for excessive hours of work.

However, if the work week begins

excessive hours of work.

However, if the work week begins on Thursday, for example, and ends on Wednesday, it would be impossible to show that Saturday and Sunday work normally falls after the employees have previously worked a bona fide standard number of hours or days in that week. Under such circumstances, premium pay for work on Saturday and Sunday is not true overtime pay and would have to be included in the regular rate

of pay

Furthermore, if the pattern of er ployment is determined by variable factors such as weather, so that employment is sporadic and there is actually no standard work week normally worked by employees, it cannot be said that Saturday or Sunday work nor-mally falls after the employees have previously worked a bona fide standard number of hours in the week. There-fore, premium payments for such work not constitute true overtime. What effect these variables peculiar to the construction industry might have upon the establishment of a work pattern would depend upon an examina-tion, in each case, of payrolls over a representative period of time.

Example: Clock Overtime

Premium payments for work in excess of a bona fide daily standard of hours are true overtime premiums under the Act, said Mr. Weiss. Thus, if employees

normally work 8 hours a day, premium rates for hours in excess of that standard are true overtime under the law.

In some cases, however, premium payments are provided for work before and after specified shift hours - for "clock overtime" as it is commonly called. If an employee has not pre-viously worked a bona fide standard number of hours in the day, the premiums paid for this clock overtime must be included in the regular rate of pay and cannot be credited towards over-time pay due under the Wage and Hour Law.

Under certain conditions, however, higher rates paid for clock overtime may be regarded as true overtime. Suppose there is an established practice or agreement which calls for pre-mium payments for hours worked before or after the employee's regular shift, and also calls for overtime pay after a bona fide standard number of hours worked in a 24-hour workday beginning at the start of the employee's shift. In such a case, the premium rates

paid for work outside the normal shift hours would qualify as true overtime pay if the employees normally work the specified number of hours in the workday before performing the clockovertime work.

For example, a contractor's crews work an 8-hour shift which begins at 8 in the morning and ends at 5 p.m., with an hour off at noon. A union agreement calls for premium payments for hours worked after 5 p.m. and before 8 a.m., and also for overtime pay for hours worked beyond 8 hours in a day. The workday in this case is defined as the 24-hour period beginning at 8 a.m. each day. If, in practice, the hours worked after 5 in the after-noon and before 8 the next morning normally fall after the employee has already worked 8 hours in the 24-hour workday, the payment of premium rates for such clock overtime would qualify as true overtime pay. This holds true even if an employee does not perform the pre-shift or post-shift work as a continuation of his regular shift, but

performs it at any time before 8 the next morning.

Mr. Weiss here added the reminder that pre-shift premiums paid for work on the first workday of the week would not be true overtime, since the employees would not have previously worked 8 hours in that day.

Example: Holiday Pay

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Premium pay for work performed on holidays must be included in the regular rate and cannot be offset against any overtime compensation which is due. The reason for this rule is that the premiums for holiday work are not paid because the employee has previously worked a specified number of hours in the day or week, since holidays, as a rule, do not fall consistently on any fixed day of the week. Accordingly, even if a particular holiday happens to fall within hours for which overtime is paid, the premium for the holiday must be included in the regular rate of pay.

(Concluded on next page)

SINCLAIR TENOL Problem in



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FOI

This does not mean that all payments known as "holiday pay" must be included in computing the regular rate. Payments to workers for idle holidays need not be included in the regular rate. Of course, idle-holiday pay cannot be used, either, to offset any overtime due under the law.

Sometimes an employee who receives pay for an idle holiday is called in to work on that holiday and receives additional pay for working. If the employee receives straight-time pay or more for working on the holiday, in addition to the pay he receives for not working, the amount received for working on the holiday must be included in determining his regular rate for purposes of overtime compensation. However, the money he receives for not working would be excluded.

Computing Regular Rate of Pay

The Court has made it clear, said Mr. Weiss in conclusion, that the employee's regular rate of pay is computed by dividing his total compensation for the work week, minus any true overtime premiums, by the number of hours he worked in the week for that compensation. This rule applies in all situations, including those where employees are paid at piece rates or where they perform different types of work for different rates of pay during the work week.

Mr. Weiss told his audience that the Administrator has recommended to Congress that the Wage and Hour Law be clarified by writing into it a definition of the "regular rate" of pay. If these recommendations are adopted, said Mr. Weiss, they will eliminate most problems arising from the Court's decision. They will also clarify other questions that have arisen from time to time regarding what should be included in determining the regular rate of pay. The Divisions' recommendations are not necessarily the last word on the subject, he said, and the Administrator welcomes any comments or suggestions from interested parties with respect to these proposed amendments.

Moldboard Glazing Ups Plow Efficiency

Chemical compounds designed to increase the efficiency of snow plows are produced by The Norgahn Co., 406 Eleventh Ave., S., Wausau, Wis. These products include Norgahn hydraulic fluid, Wing-Slide compound, and Moldboard Glaze. The Moldboard Glaze, explains Norgahn, provides the moldboard with a hard, smooth, low-friction surface which will cut through all types of snow; it eliminates piling up and prevents rust. It is sold in liquid form and can be sprayed, painted, or swabbed onto the plow surfaces.

The Norgahn hydraulic fluid and Wing-Slide compound are for the plow mechanism itself. The hydraulic fluid is said to provide acid-free protection for hydraulic hose, to withstand high pressures without foaming, and to withstand a low cold test. The Wing-Slide compound is designed to provide sludge-free lubrication under all conditions of temperature and moisture.

According to the manufacturer, it will not mix with water, it will adhere to the metal, and it will allow the wings to move freely without wearing or cutting the sides.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 53.

New Roofing Plank

A lightweight roof plank designed to provide roof decking, insulation, and sound absorption has been introduced by Durisol, Inc., 420 Lexington Ave., New York 17, N.Y. It is said to be fireproof and resistant to termites, fungus, moisture, and rats. The plank is made from steel-reinforced Durisol—a building material which consists of chemically mineralized wood shavings combined with portland cement and molded under pressure.

The use of Durisol roofing eliminates the need for sub-purlins, says the manufacturer, and its light weight permits the use of light structural steel in the supporting framework. It is designed to support a live load of 40 pounds per square foot and to be light enough to

be installed by two men.

The top side of the plank is coated at the factory with a ¼-inch cement surface. The planks are tongue-and-grooved on the long sides. Galvanized-metal clips are wedged to the steel flange and nailed to the plank during installation. Thermal conductivity of a 3¼-inch slab with built-up roofing is listed at 0.18; of a 4¼-inch slab, at 0.15. Sound-absorption coefficient is listed at 0.87 for sounds originating at 512 cycles. The planks are 16 inches in width and up to 8 feet in length. Special sizes are also available.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 17.

Hot-Water Boilers

A new hot-water boiler is announced by the Cleaver-Brooks Co., 333 E. Keefe Ave., Milwaukee 12, Wis. It is made in three sizes—an 8-hp model with an output of 250,000 Btu's; a 16-hp model with a 550,000-Btu output; and a 22-hp model with a 730,000-Btu output. All three are said to be completely automatic. They can be fired by oil or gas. A feature of these boilers is their

A feature of these boilers is their 4-pass construction designed to insure a high rating and efficiencies of 80 per cent. They have a minimum design pressure of 100 pounds and are said to be suitable for high-temperature or pressure applications. A hinged rear door, lined with refractory material, provides easy accessibility for cleaning and maintenance. Exhaust gas is carried away by means of a vent which can be connected to an existing chimney. The 22-hp model is 113 inches long, 44 inches high, and 26½ inches wide. The front end of the base, including the burner, can be removed for separate handling where required. All units are constructed in accordance with the ASME code, the manufacturer states.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 34.

Light-Reflecting Signs

Scotchlite traffic signs which are available from the Minnesota Mining & Mfg. Co., 900 Fauquier Ave., St. Paul 6, Minn., are described in a folder being distributed by the company.

The folder reproduces several types

The folder reproduces several types of traffic signs in various colors, and shows how Scotchlite is designed to add to their value at night time. It lists the advantages claimed by the manufacturer for this material, and points out that Scotchlite signs can be supplied in standard shapes, colors, and legends.

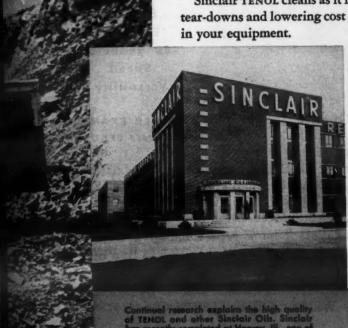
standard shapes, colors, and legends.
Copies of this literature may be ebtained from the company. Or use the enclosed Request Card. Circle No. 27.

Ends Sludging Diesel Equipment

A major problem of diesel engine operation is the formation of sludge, gum and varnish on valve stems, rings and other engine parts, which causes engine drag, increased operating costs and frequent tear-downs.

This-problem is solved by the use of Sinclair TENOL for diesel engine lubrication. Sinclair TENOL contains special Sinclair-developed additives to prevent the formation of sludge, gum and varnish. TENOL holds these harmful elements in suspension so that they are drained out with the oil at oil change periods.

Sinclair TENOL cleans as it lubricates, thus increasing time between tear-downs and lowering cost per operating hour. Try Sinclair TENOL in your equipment.



RANGE



E. W. Isom, Sincleir Vice-President in Charge of Research styre "With the new facilities now made available to us at Harvey, Ill., we expect to find many ways to help industry cut costs through better petroloum products."

HEAVY DUTY LUBRICANTS

FOR LUBRICATION COUNSEL, OR YOU MAY WRITE TO SINCLAIR REFINING COMPANY, 630 FIFTH AVE., NEW YORK 20, N.Y.

Gravel Plant's Yield Is One Ton a Minute

A lightweight gravel plant for use in processing material for secondary-road construction has been developed by the Universal Engineering Corp., Division of Pettibone Mulliken Corp., 620 C Ave., N. W., Cedar Rapids, Iowa. Capacity of the plant, when properly fed, is listed at one ton per minute with 20 per cent crushing. The plant consists of a 10 x 24-inch roller-bearing crusher, a 2 x 6-foot single-deck vibrating screen, 18-inch feed-and-delivery conveyors, and a diesel engine with V-belt drive. It is mounted on a rubber-tired chassis and its operation is controlled by one man from the operator's platform.

Material is brought to the gravity-feed hopper with a power shovel or dragline bucket. The feed conveyor picks the material up and carries it to the vibrating screen. Oversize left on the screen is delivered to the jaw crusher and then reduced to a usable size. The delivery conveyor receives the output of the crusher and the screen and loads it directly into trucks.

The plant is recommended by the company for jobs where the crushed material need not meet a rigid specification. According to the manufacturer, the crusher can be adjusted so that practically 100 per cent of the crushed material will pass a 1-inch-square opening. A similar plant is available with smaller crushers for use where the percentage of oversize is not so great, or where a smaller capacity is satisfactory.

Further information on this new gravel plant may be secured from the company, or by using the enclosed Request Card. Circle No. 46.

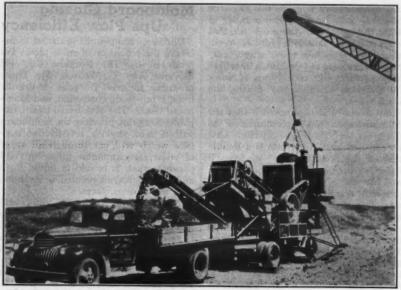
Changes for Caterpillar

The Caterpillar Tractor Co. has announced the appointment of three Assistant Divisional Parts Managers and the opening of a new parts depot at Albany, N. Y. The appointees are T. A. Dunne in the Eastern Division, J. E. Ferguson in the Central Division, and W. R. Owens in the Western Division.

The Albany parts depot was built at a cost of \$250,000 and replaces the depot at Rensselaer, N. Y. Other parts depots opened last year are at Atlanta, Shreveport, and Minneapolis.



ALLIED STEEL PRODUCTS, INC



This Universal portable gravel crusher is for use in processing material for secondary road construction and for jobs in which the crushed material need not meet a rigid specification.

Non-Technical Booklet On Cement and Concrete

A reference booklet on cement and concrete has been prepared by the Portland Cement Association, 33 W. Grand Ave., Chicago 10, Ill. In addition to technical information, the booklet contains interesting sidelights on the use and development of portland cement and bits of miscellaneous information about it.

The 1948 "Cement and Concrete Reference Book" is for the non-technical as well as the technical user of portland cement. It discusses the discovery and naming of portland cement, its commercial production in the United States, the various components in a concrete mixture and the purposes they serve, mixing and finishing methods, etc.

It also contains tables of facts and

It also contains tables of facts and figures on the total use of concrete for various types of construction. n fe E

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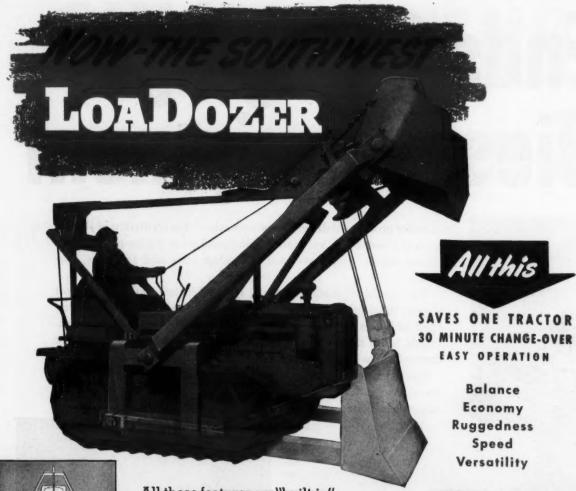
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Copies of this literature may be obtained from the PCA. Or use the enclosed Request Card. Circle No. 59.



All these features are "built-in" qualities of the new SOUTH-WEST "LOADOZER"—Extra

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CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.



State Tells Citizens About Snow Removal

Radio Talk Gives Pennsylvanians A Picture of Snow-Removal Work: Men, Machines, and Money Required

+ PENNSYLVANIA citizens who tuned in on radio station WHGB the evening of last December 28 learned all about the snow-removal work of their Department of Highways—the men who are responsible for it, the machines it requires, and what it costs. They learned among other things that the clear roads they take for granted during the 4 winter months require 12 months of planning—from May to the following April—on the part of their Highway Department.

Warren K. Myers, Chief Maintenance Engineer of the Pennsylvania Department of Highways, gave the radio talk to which they listened. It marked one phase of the Department's program of public information.

Men on the Job

Mr. Myers sketched for his listeners, first of all, the maintenance personnel involved in the huge job. Headquarters men, he told them, are the Secretary of Highways, the Chief Engineer, and the Chief Maintenance Engineer and his staff. The state is divided into eleven engineering districts, in each of which the work is directed by a district engineer, assisted by a district maintenance engineer directly responsible for snow removal in the various counties within the district.

In each county there is a maintenance superintendent who has several assistants, together with foremen, caretakers, laborers, mechanics, and equipment operators who handle the actual snowremoval work.

Size of the Job

Pennsylvania has 41,000 miles of state highways, and operates the world's largest transportation system under one management. Its snow-removal schedule includes more than 21,000 miles, said Mr. Myers, since all roads carrying more than 100 vehicles a day are scheduled for complete snow-removal service. During a storm, work is undertaken on the scheduled roads and is continued until the storm is over. When these roads are all open and safe for travel, the equipment is assigned to other improved state highways not on

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WASSE MISO COO

the schedule. Work is continued until these, too, are taken care of.

Year-Round Operations

Snow-removal efforts start in May, when the maintenance men determine how much equipment and personnel this schedule requires, and ask for funds to carry out the work the following winter. On June 1, this money is made available.

In June, July, August, and September, the Department stocks cinders and buys snow-removal equipment. In October it continues this activity and designates the roads that are to be included in the snow-removal schedule. Each superintendent prepares his program for his county. This is sent to the district engineer, who checks it and forwards it to the Central Office.

On November 1, the Department starts erecting snow fence. It places some 26,000,000 feet of it at locations where drifting is liable to occur along the entire 41,000 miles of state high-

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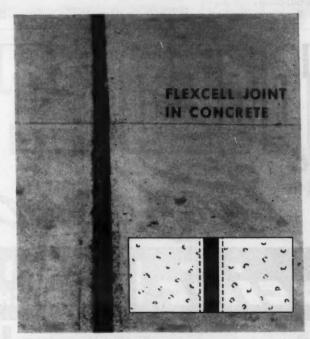


A Lorain TL-20 mobile crane sets steel sheet piling for the secondary cofferdam at Allatoona Dam. If you're wondering how it got in this high-and-dry position—it was lowered there by a cableway which it first helped to assemble.

FLEXCELL

REG. U. S. PAT. OFF.

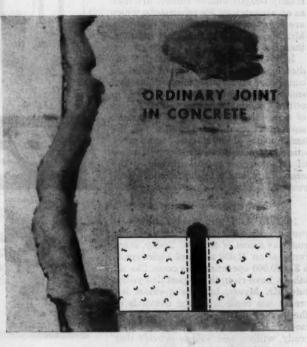
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THE CELOTEX CORPORATION

CHICAGO 3, ILLINOIS

State Tells Citizens About Snow Removal

(Continued from preceding page)

ways. Also, in November, it starts checking equipment, making the necessary repairs, and maintaining snow plows.

In December, January, February, and March, the Department is concerned with the actual snow-removal and cindering operations. Late in March, snow fence is taken down and stored, and in April the Department removes snow plows and gets the equipment ready for summer maintenance and construction work. The cycle then begins all over again.

Storm Procedure

Maintenance personnel of the Pennsylvania Department of Highways is spread throughout the state. There is scarcely a township or village, said Mr. Myers, that does not have a highway employee living within its limits. When a storm begins, a report from an emin that area is made to the county headquarters where someone is on duty at all times. When this word is received, the snow-removal organization is alerted. If the storm continues, the superintendent or his designated assistant has the operators called and instructed to report to the maintenance building. Equipment is then dispatched on scheduled routes and work is continued until all roads are again in safe condition for travel.

The Department owns 1,309 trucks, 35 tractors, and 303 power graders, all equipped with snow plows. These machines are valued at more than \$6,000,000. During a storm of statewide proportions, approximately 1,500 trucks equipped with snow plows, 300 power graders, 200 tractors, and 4,000 men are used, at a cost of \$12,000 per hour.

At the beginning of the snow storm, or during an ice storm, about 1,200 trucks and 6,000 men may be at work spreading cinders. Each year, approximately 600,000 tons of cinders are used as an abrasive on icy pavements, which are more of an impediment to traffic, Mr. Meyers explained to his listeners, than the actual snow.

In 1947 the Department installed radiotelephones on equipment used in connection with snow removal so that snow plows could be transferred to critical points with the minimum loss of time. In 1948 it increased its radio equipment, and it is hoping for the assignment of additional radio frequencies so that it can expand its use of radiotelephones still further in the near future, and thus improve its snow-removal service.

Cost of Snow Removal

In 1923, said Mr. Myers, snow was removed on 1,400 miles of Pennsylvania roads at a cost of \$91,000. Today, snow removal on 21,000 miles of highways is a \$7,000,000 operation. Its costs, like all others, have risen in the past five years, said Mr. Myers, but the greatest increase has come from the demands of the traveling public-for more service on more roads. The Department, he said, is ready, willing, and able to provide that service within the limits of the revenues at its disposal.

In conclusion, Mr. Myers told his radio listeners that the cost of building and maintaining a road system in Pennsylvania is less than one-half cent per mile of travel. It is the only cost unit of automobile purchase and operation, except tax fees, that has not increased in the past few years.

Appointments for Byers

John F. Van Way has been appointed Midwest District Sales Manager by The Byers Machine Co. Mr. Van Way, who will make his office in St. Louis, Mo.,

formerly operated his own firm in that city—Service Construction & Industrial Equipment Co.

R. E. Boehck, formerly Byers District Sales Manager in the midwest and southwest areas, will now concentrate on the southwest territory from his headquarters in Houston.

Lightweight Drill

A lightweight, self rotating, pneumatic drill is made by The Dallett Co., Mascher at Lippincott St., Philadelphia 33, Pa. It features an instantaneous rotating action designed to eliminate the need for drill-bit wrenches. The Holedrill is recommended by the company for drilling holes in concrete, brick, mortar, and all types of stone or rock.

The Dallett Holedrill will handle drills from ¼ to 1½ inch. It has a speed of from 1,800 to 2,000 strokes per minute. Length, with retainer, is 16 inches; without, 13 inches. Weight is listed at 9½ pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 64.

Snow-Fighting Equipment

Snow-fighting equipment is featured in a 12-page catalog issued by the Caterpillar Tractor Co., Peoria 8, Ill. The booklet stresses the use of the Caterpillar Models 12, 112, and 212 diesel motor graders, equipped with snow plows, in "Beating Back the Blizzard"—the title of the catalog.

Booklet No. 11699 also shows Caterpillar tractors in snow-fighting operations. Tractors with bulldozers are pictured shoving back the snow. Tractors with Traxcavator shovels are pictured doing clean-up work. Also illustrated and described is the Roto Wing attachment for use with the No. 12 motor grader.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 66.

General Mgr. for Stow

The appointment of M. J. L. Schulte as General Sales Manager is announced by the Stow Mfg. Co. Stow makes a line of concrete vibrators, flexible shafts, and flexible-shaft equipment of all kinds.

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ALLOY STEEL & METALS CO. manufactures an extensive line of wearing parts for most makes of ditching machines. The material used in the manufacture of these parts is of the highest quality, scientifically alloyed to obtain the longest wearing qualities combined with great strength. Pacific Ditching Machine Parts assure long, dependable service. Expensive downtime is reduced to an absolute minimum.









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Big Hole Excavated For River Lock Job

Whirleys on Long Trestle Handle Concrete Buckets Hauled From Batch Plant For High Wall Pours

> By WILLIAM H. QUIRK, Eastern Editor

+ THE Chain of Rocks lock-canal project for the Mississippi River near St. Louis has now begun to assume on the ground the large-scale dimensions promised by the plans and drawings. Under the direction of the St. Louis District, Corps of Engineers, U. S. Army, the huge concrete lock is taking shape in the immense hole which was dug to contain it. The complete plan of improvement involves the construction of an 8-mile canal, bordered by levees, with two navigation locks located near the downstream end of the canal. The purpose of the canal and locks is to by-pass the Chain of Rocks reach in by-pass the Chain of Rocks reach in the Mississippi River, which is trouble-some to navigation, by providing a channel of dependable 9-foot depth. (See C. & E. M., December, 1947, pg.

The locks, known as No. 27, are now being built by the River Construction Corp., a joint venture of six large con-The main lock is 1,200 tracting firms. feet long x 110 feet wide, and the auxiliary lock is 600 feet long x 110 feet wide. Work on the lock portion of the project began in July, 1947, and is scheduled for completion late in 1950, at a cost estimated to be in the neighborhood of \$18,000,000. The six companies holding the contract are the Turner Construction Co., Raymond Concrete Pile Co., Spencer, White & Prentis, Inc., all of New York City; Winston Brothers, and Al Johnson Construction Co., both of Minneapolis, Minn.; and Morrison-Knudsen Co., Inc., of Boise, Idaho.

The project is located on the left bank or Illinois side and about a mile back from the Mississippi River. The north end of the canal will be about a mile south of the Missouri River; the south end will be adjacent to the Granite City, Ill., Engineer Depot, and about 3,800 feet upstream from the Merchants Bridge in St. Louis. The 1,200-foot-long main lock will be the longest lock on the Mississippi River system, and will permit passage of the long tows now in service. Alongside of it, the 600-foot auxiliary lock will pass shorter tows and small craft more quickly and economically than could be done in the main lock.

Excavating the Big Hole

A portion of the lower reach of the canal below the locks was first dredged to permit navigation access to the locks. This was done by the Corps of Engineers with their 20-inch cutter-head suction dredges Grafton and St. Genevieve during the fall, winter, and spring of 1946-1947. They cut a channel in from the river to station 54+00, the beginning of the locks and appurtenantworks contract which extends for 3,400

PAINTS OVER RUST! **RUSTREM STOPS RUST!** No priming, scraping, brushing



feet to station 88+00. The canal phase of the improvement continues north from that point back to the Mississippi. Over 2,500,000 yards of material was excavated at the site of the locks. Of this amount about 1,600,000 yards was removed by the 20-inch suction dredge Calumet under a subcontract with the LaCrosse Dredging Co. of Chicago.

After the dredge had excavated as much as was economically possible, it returned to the Mississippi through the access channel, and an earth plug was thrown across the lower end of the site. This plug kept any river water from entering the lock excavation. The rest of the excavation was handled in three different ways. A Sauerman bucket on a cableway accounted for a sizable volume of material. A pair of Lorain



draglines with 70-foot booms and Hendrix 2-yard buckets worked over the bottom of the hole, loading four end-dump Euclids whose bodies had been

built up to increase their capacities from 10 yards to 12 or 13 yards on an average. Rock at the bottom of the lock

efficient stage in the precision-built

Hercules "Center-Lift" provides max-

imum lifting capacity with minimum use

of power, prevents cramping and elimi-

nates strain on body and hinge bolts

hauling and dumping jobs easy—and

-features that make your most difficult

Whatever your hauling and dumping

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Hercules Type X Hydraulic Hoist.



Hercules Heavy-Duty Dump Body, mounted on six-wheel chassis, with Hercules 8X Hydraulic Hoist. Body, of 10-gauge steel, measures 144" x 84" has a capacity of 8 cubic yards. "Center-Lift" principle, originated by Hercules, insures smooth, easy lifting of large capacity loads.

The Hercules Aircreter, revolutionary new unit for hauling and placing pre-mium-quality, air-entrain-ed concrete, is equipped with a Hercules 8X "Cen-ter-Lift" Hydraulic Hoist for fast, clean dumping of concrete.



Hercules D-12 Contracter's Body, sturdy unit for all-ground work. Pyramid-type enclosed full-length rub rails for

profitable.







Locks Mo. 27, which will look like this when River Construction Corp. completes them, consist of a 1,200-foot-long main lock for long tows and a 600-foot-long auxiliary lock which will pass short tows and small craft.



3. After initial unwatering operations in the excavation, clean-up of the big hole began—with draglines loading out the material, and wagon drills removing rock to grade in the bottom of the lock chamber.



2. At the site of the locks, about 1,600,000 of a total 2,500,000 yards of material was removed by this 20-inch suction dredge, the Calumet, under a subcontract with the LaCrosse Bredging Co. of Chicago, Ill.



4. Some of the blasted rock was loaded out by this Lorain dragline with a 70-foot boom and a Hendrix 2-yard bucket. The Euclid it is loading has been built up at the sides to increase its capacity to 12 or 13 yards.



5. Meanwhile, the site was readied to handle the large concrete pours. Four whirley cranes were set up on track-mounted tresties, their booms ranging in length from 100 to 110 feet. Shown here are two Wiley whirleys setting up an American whirley, with one more Wiley unit still to come. These big rigs handled form panels and concrete buckets on wall pours. The size of the job is indicated by wall dimensions—they are 92 feet high, with the interior wall 40 feet wide top to bottom, and the outer walls 45 feet wide decreasing to 9 feet at the top. The completed structure will require 400,000 cubic yards of concrete.

Big Hole Excavated For River Lock Job

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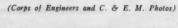
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chamber was removed to grade by the conventional drilling, blasting, and

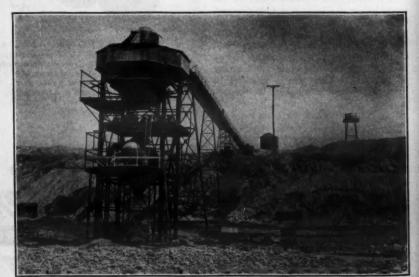
shovel work.

For drilling the blast holes in the rock, nine Ingersoll-Rand X-71 wagon drills were employed. They were driven by a battery of air compressors including two I-R stationary units at 1,350 cfm each, and two Chicago Pneumatic portable compressors rated at 500 cfm and 315 cfm respectively. They pumped to a receiver equipped with a 6-way manifold. The floor of the lock is on rock, and the walls of the chambers are seated in trenches in the rocky floor. Rock yardage in the excavation totaled 47,600 cubic yards, and the cut varied from 3½ to 12 feet in depth. Most of the material was taken out in a single-stage operation with the use of a maximum 10-foot length of drill steel to open up holes 9½ feet deep.
(Continued on next page)





6. A C. S. Johnson concrete batch plant was erected by a Bucyrus-Erie 50-B steam rig—close to the east side of the main lock and about 500 feet from the north end. The aggregate conveyor reaches it on steel trestle bents.



This shot from down in the hole looking up at the completed batch plant sh the water tank on the hill at right and the Johnson cement silo at the ce



C. & E. M. Corps of Engineers Photos
Aggregate for the Locks No. 27 project is discharged to bins under this timber trestle
(photo above) from hopper-bottom railroad cars. Under the aggregate piles is a tunnel
(photo at right) of 8-foot-diameter Armoc corrugated-metal pipe through which runs a 30inch conveyor belt. The aggregate is fed onto the belt one size at a time through ports in
the tunnel roof and is carried to the batch plant.

Holes were staggered; they were on 6-foot centers transversely and 5½-foot centers longitudinally within the chamber. They were charged with Atlas dynamite, both 60 and 40 per cent strengths. On an average, four sticks of 60 per cent powder were placed at the bottoms of the holes, and four sticks of 40 per cent strength dynamite. sticks of 40 per cent strength dynamite on top of that. The rest of each hole was stemmed with sand. Usually the area shot at one time was 80 to 90 feet long x 40 to 45 feet wide. The holes were generally drilled slightly off the vertical to form a wedge shape in the area being blasted.

Around the perimeter of this area, line holes were drilled on 11-inch centers. Every third line hole received one pound of dynamite, but the others were left uncharged. The job averaged one cubic yard of rock to 1.1 pounds of dynamite. After the blast, the brokenup rock was loaded into the Euclids by either the draglines or a Lorain 2-yard

It was felt that for such a large and deep hole a sheet pile cofferdam of considerable length would have to be driven around its perimeter to restrict the inflow of ground water. Accordingly steel sheeting was driven with great difficulty through highly compacted silty sand for a distance of 1,500 linear feet along the east side of the site. But the anticipated amount of ground water never showed up. Instead of the expected 25,000-gpm flow, the average seepage was only from 4,500 to 8,000 gpm. As a result, the slow and labori-ous driving of the long steel sheeting was abandoned as unnecessary.

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Furthermore, as the excavation proceeded, the material was used to construct levees completely encircling the hole. These levees served as a cofferdam for the site. In addition, the sides of the excavation were laid back on flat 2 to 1 slopes, and these were broken by three benches at least 20 feet wide and about equal vertical distances apart. These slopes were carefully trimmed and dressed by the cableway bucket and the draglines.

Rock Toe Drain

But the major factor in stabilizing the sides of the big hole and taking care of the ground water was the rock berm acting as a filter that was installed around the toe of the bottom slope. Before these slopes were fully excavated, a toe trench was dug to a minimum depth of 6 feet and a width of 7 to 8 feet. In places the trench was twice that size. It was backfilled with rock averaging 5 to 6 cubic yards to the linear foot. Then, as the digging progressed and the water came out of the side cuts, it was carried off through the rock toe drain and thence through a flume constructed approximately 8 feet from the toe of slope. The flume was formed by a 3½-foot x 8-inch concrete wall completely around the perimeter of the lock chamber. The slope of this flume from the upper end to the lower end permitted the seepage water to flow by gravity to a pump sump dug in the rock at the south end of the lock excavation. From there a pump plant on a barge

pumped the water through four 22-inch-outside-diameter pipes, up and over the south plug into the accesschannel canal against a maximum head of 65 feet. The dewatering barge contained four Economy 10,000-gpm elec-

(Continued on next page)





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Diamond Roller Chains provide the dependability of performance that both contractors and leading machinery builders demand . . DIAMOND CHAIN COMPANY, Inc., Dept. 487, 402 Kentucky Avenue, Indianapolis 7, Indiana. Offices and Distributors in All Principal Cities.





BELOW

From engine to main shaft, power is carried by 8-strand Diamond by 8-strand Diamon. No. 434 Roller Chain.

stripping operation



ROLLER CHAINS

Big Hole Excavated For River Lock Job

(Continued from preceding page)

tric pumps, but because of low inflow, their full capacity has not been required. A 60-inch pipe equipped with two sluice gates was provided through the south plug so that the big hole could be quickly filled with water if there was ever any danger that the enclosing levees of the cofferdam might be topped by a flood.

Preparing the Site

When the excavation was completed, it measured 2,100 feet long between the north and south plugs x 1,000 feet wide between the center lines of the east and west levees. From a natural ground elevation of around 410, the cut had a depth of 66½ feet to the floor of the lock chamber at elevation 343.5. The gate-bay sections went down 3½ feet more to elevation 340. There is about 15 feet between the toe drains and the outside of the walls, which are to be 92 feet high. The outer walls are 45 feet wide but this distance decreases in steps as the height increases, until a width of 9 feet is reached at the tops of the walls. The interior wall between the two locks is 40 feet wide for its full height. For the completed structure, 400,000 cubic yards of concrete will be required.

Thus while the digging was going on, the site was being readied to handle the necessarily large concrete pours. An access road was built from Granite City, Ill., in to the site, by breaching the main East Side Levee and Sanitary District Levee at one point. The levee was breached at another point to permit a connection to the contractor's plant from the Terminal Railroad Association whose lines serve the widespread industrial area around St. Louis and East St. Louis. The access road is carried on a new fill which ties in to the existing East St. Louis levee and presently serves as protection for the contractor's storage area. It has a 20-foot pavement on its 40-foot-wide crown, with an elevation of 424.5 increasing to 439.5 at the top of the levee.

The rail connection branches off into three spurs after coming through the levee into the large work area between the levee and the east side of the lock. One spur serves the yards of the American Bridge Co. which has a subcontract for furnishing and erecting the structural steel in the gates and appurtenant works of the structure. The second spur is the supply track for the incoming aggregate for the concrete pours, while the third leads in to the lumber and miscellaneous storage areas. Here also are located the lumber mill for the construction of the forms, general storeroom, work shop, field offices for the contractors and engineers, and the Corps of Engineers field laboratory.

Water for drinking was supplied to the project from the Corps of Engineers Depot at near-by Granite City, Ill., but for the large quantities required in the concreting operations, a well was sunk on the site. Alongside the well, and about midway on the east bank of the cut, a 10,000-gallon water tank was erected on top of a high tower. However, the well yielded only one-quarter of the expected and hoped-for amount—1,000 gpm—so additional water was

pumped from the sump down in the hole to keep the big storage tank filled up.

Aggregate Handling

Five large storage bins were laid out on the ground to contain the three sizes of coarse aggregate and the two sizes of fine aggregate used in the mix. Laid out in a row from north to south, the timber bulkhead bins contain respectively coarse sand, fine sand, ¾-inch fine stone, 1½-inch medium stone, and 3-inch coarse stone. The Columbia Quarry Co. of St. Louis furnished the coarse aggregate from its quarry at Krause, Ill. The fine aggregate or sand was manufactured at Falling Springs, Ill., by the East St. Louis Stone Co., by crushing limestone. Manufactured sand was selected as a result of tests conducted on material prior to beginning work. All aggregate was delivered to

(Continued on next page)





(So strong all parts, except tires, guaranteed against breakage for one year.) Cuts maintenance costs in half when one-man operated with wheel tractor. Due to over-tiring and no loose play, it eliminates the tendency of road surfaces to washboard. For ditching or terracing no other grader has as much clearance or range into ditch. The "HUSKY" will stand up.

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RUD-O-MATIC

Provides positive, steady tension — holds buckets steady under all working conditions.



Spring tension holds buckets steady. No weights, pins, tracks, or carriages. Cable saving more than pays for RUD-o-MATIC. Compact—easily installed. Eight models to fit all bucket sizes.

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RUD-o-MATIC Taglines are used as standard equipment by most crane manufacturers. Spring tension is powerful enough to hold a clam shell bucket steady. Operates with boom at any angle. Compact—it can be installed in less than thirty minutes. No pins, weights, tracks, or carriages to wear or be replaced. Taglines are complete with fairlead U bolt clamping plates, and cable attached. Immediate delivery—see your equipment dealer—or write—

 Dealers—selected territories in Midwest and Northwest are still open. Write for all details.

RUD-o-MATIC combination Magnet Reel and Tagline . . . operates on spring tension principle with tagline attached to magnet to steady – and electric cable fastened to magnet connections with all slack needed to prevent cable from being pulled or jerked loose from connections. Exclusive with RUD-o-MATIC.



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Corps of Engineers Photo

Tarpanlin shelters enclose concrete lifts on the Locks Wo. 27 project during cold-weather work (above). The steam heat which is piped to each monolith is generated by the locomotive shown at right, which is located near the cement silo.

the project in hopper-bottom railroad

Over the aggregate bins a timber trestle was constructed long enough to accommodate an 8-car train of stone which discharged the material according to its classification. Under the piles of aggregate lies a tunnel made from 8-foot-diameter Armco corrugated-metal pipe through which runs a 30-inch conveyor belt. The aggregate is fed onto the belt, one size at a time, through ports in the tunnel roof. A Hi-Lift loader works in the bins keeping the material piled up on top of the tunnel pipe. The Barber-Greene conveyor system used has a belt length in the tunnel of 450 feet. As this belt emerges from the tunnel into the open, it makes a right-angle turn through a transfer point and continues up an incline 700 feet farther to the batch plant.

Concrete Batch Plant

A C. S. Johnson concrete batch plant was set up within the main lock, close to the east wall and about 500 feet from the north end of the lock chamber. The conveyor reaches it on high steel trestle bents, and is actually 8 feet below the top of the east wall in elevation as it enters the main lock. The batch plant was assembled and erected down in the hole with the help of a Bucyrus-Erie 50-B steam-driven crane equipped with a boom and jib totaling 97 feet.

Back on the east bank a Johnson 3,-000-barrel silo bin was erected over the conveyor for the storage of bulk cement. Portland cement is shipped to the job site in cars from three sources: Missouri Portland and Alpha cements from St. Louis, and Universal Atlas cement from Hannibal, Mo. The cement is unloaded by a Robinson air-activated unloading system, and piped out to the batch plant through two 4-inch lines carried on the conveyor trestle. The batch plant also has storage facilities for 350 barrels of cement. When the latter is filled, the rest of the cement is unloaded into the big storage silo. The cement may be drawn either directly from the cars or from the silo bin out to the batch plant.

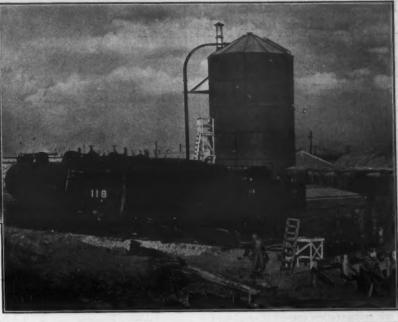
In addition to the cement line, several other pipes run out to the batch plant on the conveyor trestle: a 4-inch and a 6-inch water line; 6-inch com-

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pressed-air line; 4-inch fuel-oil line; 1¼-inch and 3½-inch lines for the refrigerant; a 2-inch line for Darex air-(Continued on next page)



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MODEL 54



MODEL 36 Self-Propelled

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WANT BETTER ROADS AT LOWER COSTS?

These machines produce a thorough complete mix in one pass at the lowest costs per ton. For mixing stabilized bases and wearing courses with any type of binder. Capacities from 100 to 350 tons per hour. Lowest initial cost and lowest upkeep cost, yet they produce the best quantity and quality.

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Write for details

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P.O. Box 620

North Hollywood, Calif.

Big Hole Excavated For River Lock Job

(Continued from preceding page)

entraining agent put into each batch of concrete; and a steam line.

The 4-inch water line is for the mix, while the 6-inch line is a general-purpose pipe for washing, curing, etc. The compressors supplying the air are housed in a Quonset hut located in the shop area, and serve both the cement-feeding system and the concreting oprecting system and the concreting op-erations through the 6-inch line. Just north of the aggregate bins are three large oil tanks with a total capacity of 140,000 gallons. One contains diesel oil for the equipment powered by diesel engines, while the remaining two tanks hold fuel oil for the steam whirley cranes used in placing the concrete. The 4-inch oil line delivers the fuel oil to points in the lock adjacent to the crane tracks.

To prevent the generation of extreme heat in these mass-concrete pours, a heat in these mass-concrete pours, a York refrigeration system is employed. This reduces the temperature of the mixing water to 35 degrees F. If the original temperature of the water is 60 degrees F, this cooling plant can lower it to 35 degrees F at the rate of 80 gpm. The smaller 1½-inch pipe line is for the high-pressure delivery of the is for the high-pressure delivery of the ammonia refrigerant, while the larger 3½-inch line is for the return.

Mixing and Placing the Concrete

Set up on a lower level of the batchplant tower are three Koehring 3-cubicyard tilting mixers where the batches are mixed for 2 minutes. They are then discharged through a hopper into Blaw-Knox concrete buckets. A dozen of new vertical-side air-operated buckets are on the job—nine 3-yard buckets and three 2-yard buckets. Three buckets are carried at a time on standard-gage flatcars which are drawn by Plymouth gasoline-powered locomotives. They operate over track which has been laid from a starting point beneath the batch-plant tower and extends out for the full length of both the main and auxiliary locks. The main lock is double-tracked, while a single track suffices for the smaller auxiliary lock. The track passes from one lock to another through a tunnel constructed in the intermediate wall.

In the main lock the standard-gage tracks for the dinkeys and the concrete-



Corps of Engineers Photo

This is the air activator for the Bobin-son cement-unloading system used on the River Construction Corp. lock job.

bucket train run along the east wall. Down the center of the main lock are the tracks for the whirley cranes which lift the concrete buckets to the forms. The whirley tracks are spaced 30 feet on centers. In the auxiliary lock the

whirley tracks are on 25-foot centers, and are about in the center of the chamber, while the dinkey tracks run beneath them. The whirley cranes also handle the big form panels. Four whirley cranes are on the project, their booms ranging in length from 100 to 110 feet; three are Wileys and one is an American.

Three of the cranes work in the main lock, from which set-up they can pour both the east and intermediate walls. The fourth crane, in the auxiliary lock, pours the shorter west wall. Other cranes on the project include a Mani-towoc Speedcrane, three Lorain No. 820 cranes, and a Lorain Moto-Crane, all with 70-foot booms. They are used chiefly in general yard work. With this equipment layout, concrete production is estimated at the average rate of 150 cubic yards per hour.

Forms

Wooden forms strengthened with structural-steel members are employed on these 92-foot-high wall pours. To

fit the various requirements, 66 different sets were constructed. The panels were not too large, for the maximum lift of pour was 10 feet in the lower part of the structure. This was reduced to average lifts of 5 feet in that part of the structure above extreme low water. The were built of 2-inch sheeting with 4 x 10's on from 12 to 16-inch centers. At the bottoms and tops of the panels are double channels for wales. The forms are tied together at the top by steel H-beams, and are high enough permit a 2-foot overlap on the lower lift of poured concrete. Richmond ties also anchor the forms into the concrete beneath the lift being poured. Above extreme low water, all forms for exposed concrete faces are lined with U.S. Rubber Co. Hydron absorptive form whi

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The monoliths are usually 30 to 40 feet long, and extend the width of the walls. As many as five are worked on in the course of a day's pour. The concrete is cured with water, and the

(Concluded on next page)



ROLL-A-METER A DEVICE FOR ACCURATELY MEASURING ENTRAINED AIR IN CONCRETE

The

Now for the first time the rolling method may be with a conveniently small size sample with ease and accuracy regardless of berometric pressure or porosity of aggregates.

The Roll-A-Meter is an outstanding value, having other important uses. Used as a Pycnometer, it provides an excellent method for determining specific gravities of cement sand, gravel and admixtures, quickly obtaining moisture content of aggregates and mak-

Precision Instrument of Solid Bronze

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Write for illustrated folder CHARLES R. WATTS & CO.

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The top one was a widening job with hot mix. Note the "feathered edge" at the right, which allowed rolling right into the old crown without worrying about excess. This is one of the advantages of the Adnun Cutter Bar adjustment and the Divided Hopper.

Look at the other job — handling trucks at 6500 ft elevation and laving 2 to 4 in, rock on

Look at the other job — handling trucks at 6500 ft. elevation and laying 2 to 4 in. rock on grades. These are just some of the advantages that make the Adnun a better buy—it has the versatility that permits you to fit it into a wide variety of work and keep it busy.

The Adnun will take the punishment of heavy work without constant rebuilding. It has the power to handle heavy trucks. Hydraulic controls make operation smooth and easy. It lays stone, cinder, clinker, sand, soil cement and hot or cold asphalt. Don't tie yourself up with a "one-job"

machine. Ask for complete details.

THE FOOTE COMPANY, INC.







whirleys shift the form panels about from monolith to monolith

Cold-Weather Work

During cold-weather work, the air in contact with the concrete has to be kept at temperatures of not less than 50 degrees during the first 5 days of the curing period. Steam was selected to supply this heat for winter protection. Two 315-hp oil-fired steam locomotives were located near the cement silo, and one 6-inch steam pipe was laid from them to the lock excavation via the concreteaggregate trestle and thence to the monoliths by 4-inch pipe. An Elgin water-softening plant of 100-gpm capacity was installed to treat the boiler feed water for the locomotives, since the untreated water contains a high iron content detrimental to the boiler

All concrete lifts are enclosed with Wenzel tarpaulins supported by 45foot-long timber trusses spaced on 6foot centers. These covers are left in place for the full 14-day curing period. The live steam supplied for heat will also serve as the moist curing medium for the first 5 days of the curing period. Steam is also introduced into the mixing water as required to maintain concrete at a temperature of 40 degrees when it is deposited in the forms.

Quantities and Personnel

The major items in the lock contract include the following:

cu. yds. cu. yds. cu. yds. cu. yds. cu. yds. bbls. Stripping Embankment, levee Backfill Absorptive form lining Steel reinforcement sq. ft. lbs. cu. yds.

During the excavation operations, a force of from 300 to 350 wa s employed but this figure increased to between 500 and 700 when concreting got under way in the autumn of 1948. Among the personnel of the River Construction Corp. are Frederick B. Spencer, General Manager; Alex Jonsson, General Su-perintendent; S. C. Doughty, Principal Engineer; G. H. Rantanen, Superintendent; and J. W. See, Mechanical Su-

For the Department of the Army, Corps of Engineers, the Resident Engineer is Lt. Col. Paul E. LaDue, with Greer A. Allen as Assistant Resident Engineer. The project is under the direction of Colonel R. E. Smyser, Jr., District Engineer, St. Louis District. E. H. Shutt is Technical Information Officer. The Division Engineer, Colonel Clark Kittrell of the Upper Mississippi Valley Division, exercises general supervision over the work.

In the latter part of 1948 the Bushman Construction Co. of St. Joseph, Mo., completed the construction of a highway bridge carrying U.S. 66 across the canal site. Contracts for digging the canal above and below the locks to connect with the Mississippi River have not yet been awarded. They will in-volve over 20,000,000 yards of earthmoving for the new channel.

Mineral-Aggregate Report

Papers dealing with mineral aggregates have been compiled in pamphlet form by the American Society for Testing Materials. These papers were pre-

Vulcan Tools

Vulcan Tool Manufacturing Co. 35-43 Liberty Street, Quincy, Mass. Branch Offices and Warehouse Stocks. 34 No. Clinton St. 74 Murray St. New York, N. Y. Chicago, III.



E. M. Patto sonnel on the Chain of Books Locks 27 project includes (front row) Resident Engi-r La Due, Superintendent Bantanen, Technical Information Officer Shutt, (back row) acipal Engineer Doughty, General Manager Spencer, Assistant Resident Engineer Allen, and General Superintendent Jonseon.

sented at a symposium held in connection with the 1948 annual meeting of the society. The symposium was sponsored by the Committee on Concrete and Concrete Aggregates, and the Committee on Road and Paving Materials. Technical Bulletin No. 83 contains reprints of the 15 papers presented at the meeting. They discuss the distribution, characteristics, and uses of minaggregates; their sampling, production, and manufacture; their grading

for use in bituminous construction or in portland-cement concrete and mortars.

The book is 250 pages long and contains numerous tables, diagrams, charts, and photographs. Copies can be obtained from ASTM headquarters, 1916 Racé St., Philadelphia 3, Pa. Cost of the book is \$3.00 in a heavy-paper cover, or \$3.65 in cloth binding.

LeTourneau Appoints Four

Four new District Sales Representatives have been appointed by R. G. LeTourneau, Inc. Steve A. Batorson will cover northeastern United States and eastern Canada from his headquarters at Syracuse, N.Y. Fran W. Duke will cover lower New York State, upper New Jersey, Pennsylvania, and Maryland. M. B. Crowley will cover Virginia, West Virginia, and North and South Carolina from his headquarters in Raleigh, N.C. And Jim Sevick will cover Oklahoma, Arkansas, Mississippi, Louisiana, and western Tennessee.



material.

Facts About the NEW PlyForm

- A grade of Interior-type plywood, PlyForm is bonded with highly moisture-resistant, but not waterproof glues.
- Specifications demand that PlyForm withstand several cycles of wetting and drying without failure.
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- PlyForm specifications require that inner plys be of "C" veneer in which there is strict limitation of wood characteristics such as small knotholes . . . this to give maximum serviceability for rugged use.
- PlyForm is sanded on both faces to give a smooth, fin-free surface. PlyForm continue to be mill-oiled (unless otherwise specified), and edges are sealed.

Douglas Fir PLYWOOD

tions set forth in U. S. Commercial Standard CS45-48, effective November 1, 1948. The new booklet details the new grade

and its uses, including a full report of laboratory and field tests which prove the new grade to be a superior concrete form



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Here is a model view of the Hyster automatic brake which is now available for the D6M towing winch.

Towing-Winch Brake

An automatic brake for use as optional equipment with the D6N towing winch is announced by the Hyster Co., 2902 Clackamas St., Portland 8, Oreg. According to the manufacturer, the brake is simple in design and quick and positive in action. It is of the same general type as the automatic brakes used with the Hyster D8N, D8L, and D7N towing winches.

The brake lever is set before winching so that when the drum stops windthe brake automatically engages and holds the load in place. The single pawl or dog carried by the revolving arm is retractable and does not click against the ratchet teeth in the rim, the manufacturer explains. Use of the automatic brake is said to reduce excessive shocks in the main line, give longer life to the cable, and simplify operation of the winch by the driver.

Further information may be secured from the company, or by using the en-closed Request Card. Circle No. 36.

Kinney Announces Changes

A Cleveland, Ohio, branch office has been opened by the Kinney Mfg. Co., maker of liquid and vacuum pumps, clutches, and bituminous distributors. Located at 202 Plymouth Bldg., 2036 E. 22nd St., Cleveland 15, Ohio, the office is under the managership of William B. Mills. The territory it covers includes the states of Ohio, Kentucky,

and West Virginia, as well as northwestern Pennsylvania and western New York.

Also announced is the appointment of Robert C. Webster as General Sales Manager. He succeeds William E. Worcester, who has been promoted to Vice President.

Re-Usable Socket Speeds Scaffolding

Sockets designed to speed the erec-tion of scaffolds, saw horses, or various types of lean-to jacks are available from the Miller Mfg. Co., 1406 W. Lake St., Minneapolis 8, Minn. The Hollo-Wedge scaffold sockets are simple to use, says Miller; they require no bolts, pins, or extra equipment, and are re-usable. They are made in two sizes for use with standard-dimension lumber the No. 2-4-4 is used with 2 x 4's for both the legs and horizontal ledgers; the No. 2-4-6 uses 2 x 4's for the legs and 2 x 6's for the ledger. No trimming or fitting of wood members is necessary, the company points out.

Feature of the socket is the special

wedge to take care of any adjustments required. To erect the scaffold, the socket is slipped over the ledger with the wedges towards the center. The legs are then inserted and the wedges are driven into place with a hammer. To take apart, the wedges are tapped loose and the wood members are lifted out.

Further information may be secured from the company, or by using the en-closed Request Card. Circle No. 55.

Joint-Sealing Compound

A rubberized-asphalt joint-sealing compound is described in a folder issued by The Flintkote Co., Inc., 30 Rockefeller Plaza, New York 20, N. Y. Among the features claimed for Flintseal are these: that it will remain re-silient and rubbery under all weather conditions, that it will adhere to the walls of joints, and that it will not lose bond at low temperatures nor flow in hot weather. The folder describes and illustrates the preparation of joints prior to being filled with the Flintseal compound; the preparation and heating of the material itself prior to pouring operations; and the proper method of application.

The folder describes in detail how to heat the material, and to what temperatures, in order to obtain the best re-

Quick, easy starts

drawings, it shows also how the material reacts under changes in temperature and during the subsequent expan-sion and contraction of the concrete

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 43.

Syntron Co. Names Three

Mark Chisholm is the new District Sales Manager of the Des Moines sales office of the Syntron Co. Ernest K. Hood is District Sales Manager of a new sales office in Kansas City, Mo. And R. K. Bentzien has been added to the Milwaukee, Wis., sales office staff.



BETTER—Because the compressive strength of concrete cured by Fulco Mats is gre than that cured by any other method. Concrete cures uniformly, reduces the possibility of cracks to absolute minimum.

QUICKER - The constant dampness necessary to curing concrete can be maintained easier, with less water, and concrete cures in 72 hours. Fulco Mats insulate against temperature changes, too.

CHEAPER-Fulco Mats require less water. They are easier to keep wet, and because they can be used on job after job, their per job cost is reduced to an insignificant

Fulco Cotton Concrete Curing Mats are favored and approved for state and Federal highway construction. FULCO Mats are mode 5½/x2² in size, durably covered with tough cotton fabric, filled with padding weighing 12 oz. per sq. yd.

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Every contractor needs Fulton Triple-Strength Tarps of 1,000 uses, for protecting machinery and sup-plies from the inroads of the weath-. WRITE FOR PRICE LIST, ADDRESS NEAREST FACTORY BRANCH





Hotstart

ELECTRIC PRE-HEATER

The KIM Hotstart is particularly valuable in cold or cool weather, but its installation is worthwhile at all times. particularly on engines in vehicles being used on short run or start and stop work. If you operate mobile or stationary engines of any kind-Diesel or Gas -a KIM Hotstart will pay handsome dividends. Literature on request,

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Cement and covering tape can be ap-plied to wall joints or cracks in one n with this Superior Drywall Applicator Mfg. Co.

Wall Joints Sealed By Tape and Cement

A tape-and-cement machine to speed dry-wall construction is manufactured by Superior Drywall Applicator Mfg. Co., 107 N. Hydraulic, Wichita 7, Kans. It is designed to apply cement and covering tape to wall joints in one operation. According to the manufacturer, the machine will automatically spread the cement mortar to the thick-ness desired. It will handle perforated tape up to 2 inches wide.

To use the machine, the operator

holds the tape in place with his fingers at one end of the joint, and with his other hand draws the stainless-steel ejector control of the applicator along the crack or joint to be sealed. A perforating cut-off cuts the tape.

The applicator will hold 250 feet of tape and 3½ pounds of joint cement. It is made in two models—one of aluminum which weighs 61/2 pounds empty, and one of magnesium which weighs 4½ pounds empty. Its overall length is 25 inches, width at widest point is 8½ inches, depth of body is 21/2 inches, and the handles measure 21/2 inches.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 61.

Bulldozer Fork Arms

Fork arms for attaching to bull-dozers are manufactured by the Dozer Blade Fork Co., P. O. Box 1605, Parkersburg, W. Va. They are designed to extend the use of the bulldozers and convert them into carrying or hauling units. These forks can be used to lift material placed on pallets, or they can be made into platforms for loads by extending planks across them.

The forks hang from the top of the dozer blade and require no equipment or hardware to attach. They extend 31 inches from the front of the blade, and are adjustable to fit blades from 22 to 48 inches in height. The manufacturer points out that they can be loaded at ground level or from trucks, and that they can be used to deliver materials place the tractor can go.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 48.

Data on Dragline Buckets

Heavy-duty dragline buckets are the subject of an 8-page catalog distributed by the Electric Steel Foundry, 2141 N. W. 25th Ave., Portland 10, Oreg. Features of the Esco buckets described in detail in Folder 111-D include the hollow section arch, trunnion brackets, cutting teeth, design of the lip between the teeth, corner wearing shoes, runners, hitch and pin, rope sockets, cleves, and chain.

The folder shows photographs of the buckets in use and illustrates other

Esco equipment including manganesesteel dippers, blade ends for bulldozers, orange peel buckets, and other styles of dragline buckets.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 24.

Pirnie Receives Award

Malcolm Pirnie has been named vinner of the Hoover Medal for 1948. This medal for distinguished public service by a member of the engineering profession is awarded by four national engineering societies—The American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the American Institute of Mining & Metallurgical Engineers.

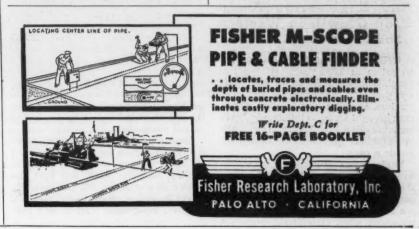
The award gives recognition Pirnie's leadership in formulating a program for the post-war industrial control of Germany and Japan. It was presented at the 96th annual meeting of the ASCE.

Chain Belt Depot in South

A warehouse has been established in Atlanta, Ga., by the Chain Belt Co. It is located at 878 Ashby St., N. W., and is under the direction of J. S. Moore, District Manager. Supervision of the new warehouse is under G. J. Schuelke.

formerly of the Milwaukee office.

The new warehouse will serve the entire southeast region including the states of North and South Carolina, Virginia, Georgia, Florida, and Ala-bama. It will stock a complete line of Rex and Baldwin-Rex equipment and





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all types of operating conditions. Mud or dusthot or cold, Gulf lubricants insure top-notch performance and a minimum of mechanical delays.

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Topsoil Engineering Enriches the Nation

Dirt-Moving, Irrigation,
And Engineering Assist
Crop Growth in Western
Soil-Conservation District
An agricultural graduate, a Nebraskan,
a former Extension Service irrigation
engineer, a former Soil Conservation
Service engineer, a lover of the soil, a
methodical worker, and a fast dirt-

+ ONE of the greatest advances in land irrigation in 2,000 years is the art of shaping the earth for water with modern grading tools. Until the advent of tractors, scrapers, and leveling planes, men brought water to thirsty acres over contours shaped by Nature. Now, within practical limitations, machinery builds a path.

Engineering, education, and earthmoving are playing their part in reshaping the thought of an agricultural part of this nation. If sociological trends are any indication, the day is fast approaching when agricultural engineering in the form of agronomy and dirt manipulation will be a big business wherever crops are grown. Productivity of the land must be increased to feed an ever-growing population.

Around Kearney, Nebraska, many farmers who seldom thought of farming any other way but the "dry land" method are now turning to irrigation. In six soil-conservation districts, comprising six rich counties in central Nebraska, in the Platte and Loup River valley floors, the Soil Conservation Service of the U. S. Department of Agriculture is hard at it promoting better strike the service of the

ter agricultural engineering.

"Find out what each acre will grow, and then make it grow it" is the rule. And this rule is opening up many new opportunities for contractors and machines to get started in a small way on jobs of from \$100 to \$30,000.

Meet Bill Pierce

The soil-conservation districts in this area have had as many as 13 small soil-conservation contractors operating out of one county at a time. And one of the better and more permanent contractors is Bill Pierce of Kearney, according to most of the farmers of the region, who call him day and night to give their farms a face-lifting.

Pierce is especially well qualified for

Pierce is especially well qualified for the type of earth-moving he is doing. An agricultural graduate, a Nebraskan, a former Extension Service irrigation engineer, a former Soil Conservation Service engineer, a lover of the soil, a methodical worker, and a fast dirtmover, Pierce is regarded in central Nebraska as one of its best authorities on land-leveling and irrigation. He was also formerly with the U. S. Bureau of Reclamation, and he is still imbued with the Bureau's original goal of increasing the wealth of the nation by improving its soil resources.

He gets a job, say, on a 300-acre farm. His contract calls for the development of land contours to make irrigation feasible, and the work will cost the farmer an average of \$35 per acre. He moves in with a survey party, makes a complete topographic map on 50 x 100-



C. & E. M. Photo Beside this rich-looking cornfield is an irrigation ditch freshly dug by Pierce's crew. Water will soon be turned into it.

foot grid elevation shots. He and the farmer and usually one of the Soil Conservation Service men under the direction of Evan Hartman, District Conservationist, then get together and draw up a plan of the layout. In hardly any time, one of Pierce's Caterpillar D7's

and a 12-yard LeTourneau Carryall are on their way to start the work. one

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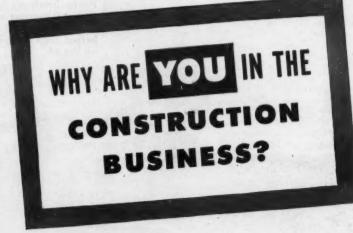
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Under Pierce's careful supervision the land is shaped, valuable topsoil is left on top, and the main ditches for irrigation water are dug. A business (Continued on next page)



THE real reason you're in the construction business is to make money . . . isn't it?

Well, do you know any better way to make money

than to save money?

You can save *plenty* of money with trucks that fit your job . . . Dodge "Job-Rated" trucks.

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waste money with a truck that's too big for its job; and you're in for plenty of costly maintenance expense if your trucks are too small.



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And remember . . . only Dodge builds "Job-Rated" trucks. Talk to your Dodge dealer!





associate of Pierce comes out and drills the necessary wells to flow about 1,000 gallons per minute. When Pierce finishes his work, land which formerly produced 25 bushels of corn an acre at once jumps in productivity to 80 or 90 bushels. With corn at \$2 per bushel, the contract justifies itself many times over the first year.

Pierce specializes only in what is called "land-leveling". This does not mean leveling in the literal sense of the word. It means, rather, that a farm is shaped so that main irrigation-water ditches can be laid to a rather level grade, and that the water can be sent out through plastic tubes, usually, into the irrigation furrows between rows of crops. This water will be under control at all times, it will flow and saturate the soil according to the capabilities of that soil, and it will all be used without waste.

To get this result, careful topographic surveys and farm-conservation plans are necessary. The Soil Conservation Service gets Congressional appropriations from year to year to help farmers in soil-conservation districts work out these conservation plans and to give technical aid in putting them on the land. Construction, however, is done either by the farmer or by a contractor he hires for the job. The demand for these plans is so great that the 24 SCS employees in the six soil-conservation districts are hard-pressed to keep up with it, and it is fortunate that Pierce is able to handle the technical layout of the irrigation jobs he does.

In any case, the survey always comes first. After that, the farmer, Pierce, and a Soil Conservation Service technician can get together and agree on what the plan shall be. The farmer, of course, has the final say as to what the decision shall be, because it is his money and his farm. But the majority of farmers hold both Pierce and the Soil Conservation Service men in such high regard (they, too, have been farmers) that most of the plans are a compromise of the best ideas of each of the men.

In addition to his Caterpillar D7's and two 12-yard LeTourneau Carryalls, Pierce uses a land-leveling plane which he himself developed. He moves it around behind a Caterpillar DW10. Not only does he keep this equipment busy until the ground freezes in early winter, but most of the time he has to rent other equipment as well.

The Carryalls almost always work on hauls balanced under 700 feet, and 400 feet is a common length of haul. These machines rough in the grading, allowing usually about a 30 to 40 per cent shrinkage factor in the fill sections so the dirt will settle true to grade.

Finish work by the Carryalls is regarded as too expensive for the fee of \$12 per hour ordinarily paid. So Pierce developed his own land-leveling plane to meet the need for a machine which is large enough for the work and which can be moved around the country without having to be loaded on a low-bed trailer.

The machine is 10 feet wide, and can be widened to 12 feet when it arrives on a job. The 10-foot width meets highway limitations. It has a 60-foot wheelbase, a hydraulically controlled cutting or leveling blade, and is mounted on rubber earth-mover tires. The rear wheels are caster-mounted, permitting the machine to maneuver in close space. It is controlled from the Caterpillar DW10 by the operator of that machine. It is so efficient that it will easily keep up with all the work Pierce normally has under contract.

Pierce himself is so interested in the land that he is performing one of the most unusual "extra" bits of service free of charge ever seen in this type of work. He is saving all possible topsoil, and he never makes deep cuts down into the subsoil without coming back in when that is done and dumping 6 or 8 inches of good black dirt on top of the



C. & E. M. Photor
The Caterpillar D7 and LeTourneau 12-yard Carryall above are owned by contractor Bill
Pierce and have an important part in his soil-conservation activities. They are shown here
leveling some land near Kearney, Nebr. In the other picture, Evan Martman of the Soil
Conservation Service, left, gets some information from one of Pierce's catekinners.

graded area. It makes friend after friend for him among the farmers, and word has traveled fast.

"When Pierce does your job," they say, "you'll never have bare spots in

your cornfields."

Pierce is making no special effort to sell himself, but instead is letting the enormous amount of dirt he moves in a season with his own rigs do the talk-



ing. It is a powerful, persuasive tongue.
In addition, Pierce makes frequent trips all over the west, usually in winter, to keep in touch with irrigation and (Continued on next page)



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FOR MORE PROFIT . . . LOWER MAINTENANCE

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BREAKDOWNS caused by faulty machines or equipment result in loss of time and money. Hendrix Lightweight Dragline Buckets are designed to handle and are capable of handling all types of excavating with less loss of time and with less maintenance.

The HENDRIX is a tough bucket! Manganese Steel chains, fittings, and tooth points take the brunt of abuse. The all-welded construction assures maximum strength during operations. Perfectly balanced, this is the one bucket with which operators can easily get a full payload every trip. It's the one bucket operators throughout the country know can "take it" and give long-lasting service.



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MANSFIELD - LOUISIANA

Topsoil Engineering Enriches the Nation

(Continued from preceding page)

farming methods from Arizona's Salt River Valley to the Central Valley in California. He works closely with Conservationist Hartman and others aiding the Soil Conservation District in the area, and honestly tries to render good, low-cost service.

low-cost service.

"After all, I'm going to live here for many years", he explains.

Soil-Conservation Policy

Along with men like Pierce, men like Evan Hartman of the Soil Conservation Service are likely to command positions of ever-increasing importance in the nation's food program. The situation is much more serious than most people can realize. At least one-third of the valuable food-growing topsoil of this nation is gone—washed away, blown away, rooted up, and sent down the Mississippi into the Gulf of Mexico.

Lately, another serious type of loss has been occurring. Improper irrigation is being done. Water is standing too long in the furrows, with the result that much valuable plant food and nourishment is leaching on down in the ground, beyond the normal root zones. Fields that once produced heavily have dropped off. Farmers are asking, "Why?" Alarmed, a nation is providing through the Soil Conservation Service expert men with experience, like Hartman, to give out the answers.

This he can do. Born and raised on a farm in western Nebraska near Ogallala, Hartman is a graduate agronomist and agricultural engineer. He uses his education and he needs his experience, for his work now consists of directing other SCS men in his work group in activities that include engineering, agronomy, salesmanship, forestry, earth-moving, and speaking in public and over the radio. Above all else, he knows and loves this land. The job of the Soil Conservation

The job of the Soil Conservation Service is as simple as its title, and as complex as the experience and ideas of all the farmers in the land. They tell the story out around Kearney of the SCS man who drew up, at the request of an old farmer, a plan of development for his farm.

The old farmer looked it over. Used to the customs of many years, he just didn't get it inside his skull. Finally he



C. & E. M. Photo
District Conservationist Evan Hartman
looks on as contractor Bill Pierce

said, "Well, son, I didn't think you fellers could help me. Y'know, I really ain't using a quarter of what I know,

anyway!"

Fortunately, not many of the farmers around Kearney pack this old gentleman's kind of intellectual equipment. The job that the SCS is doing is aimed at a community whose members, if not lavishly equipped with know-how, are eminently reasonable. Still, the toughest problem in the whole district is that of teaching them the proper way to irrigate.

Most of the water supply for this purpose comes from wells privately drilled in the Platte River valley floor, and equipped generally with Peerless turbine pumps.

There is a great variety of soils in the area. Much of it is a silty loam, light and easy to irrigate. Some is a mediumheavy soil, and there is some clay. Some of the subsoil is 100 feet deep and drains readily; some is underlaid by hardpan and does not drain easily.

It is harder than one realizes to induce a farmer to make a thorough, intelligent survey of the topsoil and

FREE!

subsoil conditions on his own farm, usually not more than 500 acres. It is still harder to get him to learn how irrigation water affects a soil. A light, fine, deep soil requires a heavy application of water for a very short period of time, because this kind of soil takes the moisture readily and lets it go right into the plant roots. A dense soil, on the other hand, requires a light flow of water over a longer period to let the water accomplish the same result.

Slowly but surely, Hartman and the SCS men under his direction are persuading the farmers to make their own analyses of this. Irrigation volumes are being studied, and the results checked by digging down into the root zones with a shovel. More and more the farmers are coming to know what they are doing.

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Salesmanship Required

A district conservationist has to be a good salesman. Ordinarily Hartman (Continued on next page)

PROFIT SYSTEM TOOLS

Here is the only rig which digs a trench,

backfills it, then loads the surplus dirt. It's spectacular . . . in a class by itself!

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CUT COSTS! . . . Trench and Load With

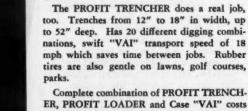


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far less than a competitive trencher alone. And there are many other PROFIT SYSTEM advantages. Ask your CPC-Case dealer for further details.

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Yes, I am interested in more information about your Profit System for the Case "VAI" tractor. Please send me your free Bulletin 121!

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CONTRACTORS AND ENGINEERS MONTHLY

preaches his gospel of soil conservation informally, but he also succeeded in getting a short summer course on the subject taught at a near-by teacher's college so that teachers would be able to convey the subject intelligently to their young pupils in country schools. And he occasionally appears on the local radio station.

This year he even sponsored a ven-ture called "Souls and Soils" and took a group of gentlemen of the cloth out on a long field trip. At one farm, whose owner had sworn a week before that he was convinced of the efficiency of contour farming, Hartman sadly noticed furrows going up a hill, over the top, and down the other side.

"Gentlemen," he told the ministers,

"I am in the same embarrassing position that each of you has been in many times. How often have you shown a sinner the light, converted him, rejoiced, and then found him a week later lying drunk in a gutter?"

The ministers looked at the furrows and got the idea. There were some

enthusiastic sermons on soil conservation in west-central Nebraska churches this past summer, complete with Bibli-cal quotations and references.

Hard Work Dominates, Though

Effective as Hartman's occasional flights of such press-agentry are, most of his solid results come from hard work and day-to-day attention to SCS policies and details. More and more of the farmers come in now to the supervisors of the soil-conservation districts for the technical help and advice which they have learned to respect.

A man wants an SCS technician to

work out a plan to improve his place. The technician—in this area, under Hartman's supervision—usually analyzes it from four viewpoints: (1) the type of soil is considered, (2) the general slope of the land is measured, (3) crops raised successfully and unsuc-cessfully in the past are taken into account, and (4) the farm's appearance with reference to erosion is studied.

From these factors comes a recom-

mendation that will improve the productivity of that farm to the utmost, and maintain productivity. There is a vast difference between "farming" and 'mining" the soil.

Pastureland, too, is judged. The four general grades of pasture are poor, fair, good, and excellent. It is always possible to improve the first three classes so the recommendations are slanted towards that result.

All the latest types of improved farming must be considered in agricultural engineering. There is one type of crop growing called "stubble-mulch farming" where stubble and straw are left on the ground. The straw on the surface prevents sealing of the surface by rainfall, and as the straw decays, it helps to build up the organic matter in the soil. It has been proved that soil treated this way takes in water much more readily than before and holds it better than it would if left clean! Moisture plays as important a role here as it does in compaction work with soils on a heavy dam.

Wind protection with trees, contour farming, strip crops, crop rotation, and equipment use are all recommended by the SCS. Hartman and the other SCS employees have even helped to develop special machines for local work: special seeders that will sow grass seed as fine as thistledown; a special tree-planting and tamping machine which sowed 14,-000 juniper trees and packed the soil

(Concluded on next page)



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You find trucks like that at International Harvester . . . a builder of truck power for 42 years, a manufacturer who knows what tough trucks need.



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For 17 straight years, International heavyduty trucks have been America's first choice for heavy-duty work. Registration figures prove it. In trucks having gross weight ratings over 16,000 pounds, Internationals are so far ahead of the field that the heavyweight crown carries a Triple

Right now, International Dealers and Branches can give you quick delivery on International heavy-duty trucks . . . specialized trucks, engineered and powered for your job.

Your nearest International Truck Dealer or Branch will be glad to send a qualified transportation engineer to analyze your hauling problem, to give you facts and figures on equipment to meet your specific needs, to answer any questions you may have. Call him soon.

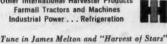


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CBS, Wednesday evenings

Topsoil Engineering **Enriches the Nation**

(Continued from preceding page)

around them in 5 hours

He and the other SCS technicians have shown the farmers how to build farm ponds to trap rain water. They have given advice on how to use ponds for livestock watering and fishing, and how to plant a truck garden in low ground behind the dam and irrigate it

with a pipe from the higher reservoir.

Last August, an extensive demonstration was held of all the latest methods of farming in that section. Included in the demonstration was a test section bordering a county highway. There the farmer took down a fence which he never used but which was costly to maintain. The county motor grader made one pass and eased the backslope. The farmer then planted the roadside in rye and alfalfa. That side of the county road now looks wide and safe, ared to the weed-choked section of ditch and unsightly fence on the opsite side. Later, when the stand of alfalfa and brome comes up, the county highway department will get some free mowing and the farmer will get some free hay. Both will be pleased, and the road will be much safer and more beautiful for motorists.

There was a day not many years ago when a county agent fresh from agri-cultural school attempted to tell a farmer what crops to raise.

The old man bristled with indigna-on. "What right hev you got tellin' me whut t'grow, yuh young whippersnap-per?" he sputtered. "Why dammit, I wore out three farms already!"

Topsoil engineering has brought the farmer, the engineer, and the small contractors of the country a long way beyond that point.

Roller-Chain Work Speeded by New Vise

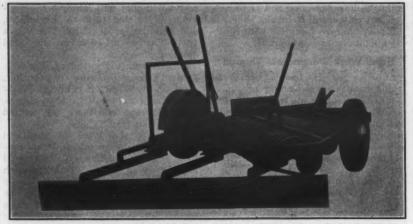
A vise designed to speed the assembly and repair of roller chains is announced the Baldwin-Duckworth Division, Chain Belt Co., 374 Plainfield St., Springfield 2, Mass. The Baldwin-Rex chain vise features jaws which are said to provide a firm seating for the pin link being worked on. The vise is made in two sizes-the No. 1 for single-width chains with a pitch of ½ to 1 inch, and for the Models D-40 and D-50 doublewidth chains; and the No. 2 for single-width chains with a pitch of 1 to 2 inches, and for the Models D-80 and inches, D-160 double-width chains.

In operation, the chain is seated in the vise; the side clamps are tightened down through a screw arrangement; and the pins are removed by striking alternate blows on them with a drift and hammer. The manufacturer points out that these chain vises can be used with both cottered and riveted pins. The Model No. 1 vise has a weight of 5½ pounds; the No. 2, 281/2 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 16.

Surfacing Machine Has a Triple Action

A road-surfacing machine designed to provide three actions in one opera-tion is manufactured by the Mainte-nance Equipment Co., 90 Dexter Road, East Providence 14, R. I. Designed for black-top work, it is also recommended by the company for gravel maintenance. It is towed by a tractor, truck, or Jeep. The Meco Roadmaster's triple-action feature involves a primary mixing and scarifying blade which plows, loosens, and mixes the material; a secondary mixing and shaping blade of segmented spring-tensioned sections, which provides rough shaping and carries surplus



A primary mixing and scarifying blade, a secondary mixing and rough-shaping blade, and a finishing blade, give the Meco Roadmaster triple action in road maintenance.

material to a windrow; and a solid, adjustable, finishing blade which picks up the windrow and provides a final sur-

In black-top work, the Roadmaster

handles a 1-inch base best, the company says; and will also hone a second coat of bitumen for the double-tack process. It will mix from 1/5 to ½ gallon of bitumen with sand or stone. On

concrete, the Roadmaster is said to hone and shape from 4 to 6-foot shoulders at speeds of from 8 to 10 mph. For construction of gravel roads, it is said to hone and shape at speeds of from 8 to 12 miles per day; for maintenance, at speeds of from 12 to 18 miles per day.

Further information may be secured from the company, or by using the en-closed Request Card. Circle No. 12.

Steel Co. Changes Its Name

The Southern Steel Works Co., Birmingham, Ala., announces that its name has been changed to the O'Neal Steel Works Co. The firm thus takes the name of its President, Kirkman O'Neal, who founded the company in 1922 and has directed its management ever since. There is no change in management, ownership, policy, or service, however.

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The name of the subsidiary Southern Steel Co., dealer in warehouse steel, is changed to O'Neal Steel Co. The offic of both companies are located at 745 N. 41st St. in Birmingham.



Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

se brief abstracts of court decisions may aid you. Local ordinances or state la alter conditions in your community. If in doubt consult your own attorn

Legality of Employment To Secure Public Contract

The Problem: A local construction engineer found he was financially unable to undertake the engineering work on a large municipal sewer project. So he secured employment by a non-resident engineering firm to help it secure the contract on that project and on a water works project. He was to be paid a percentage fee as compensation. The services consisted principally in keeping the firm informed as to the local situation, convincing local civic leaders that the firm should be employed, etc. Attempted exercise of corrupt influence over the municipal officials was not involved in the services.

The contracts were secured but later canceled after engineering services had been partly rendered. The firm refused to pay the local engineer the agreed percentage of what it earned, on a theory that the employment contract was against public policy and therefore void. Was it justified in its refusal?

The Answer: No, decided the Florida Supreme Court. (Robert & Co., Inc., defendant-appellant v. Mortland, plaintiff-appellee, 33 So. 2d 732.) The court said that the contract did not contemplate the use of illegal political influence; and that it was not invalid because the employment was contingent upon the firm's securing a contract for the engineering work. But the court added: "It is quite true that if the contract with the public body is secured as a favor in exchange for personal or political influence, it is contrary to public policy and cannot be enforced."

Obviously, the same legal principles would apply to securing public construction contracts. And similar conclusions have been reached by the courts of other states, as follows:

Where a Federal construction contract was in danger of being awarded to another bidder.

tracts. And similar conclusions have been reached by the courts of other states, as follows:

Where a Federal construction contract was in danger of being awarded to another bidder, the lowest bidder employed an attorney on a contingent-fee basis to "urge and persuade" the War Department to award the contract to him. The Washington Supreme Court decided, on the facts presented, that the employment contract was legal, saying: "The contract could conceivably have been lawfully performed without engaging in any act or practice which was contrary to the public morals or the public welfare." (Hall v. Anderson, 140 Pac. 2d 286.)

In an Ohio case, a non-resident bidder agreed to pay a resident a percentage of the selling price for his services in inducing municipal authorities to award to the non-resident a contract to install an incinerator plant. The United States Circuit Court of Appeals, Second Circuit, decided that the agreement was not shown to be illegal. (Coyne v. Superior Incinerator Co., 80 Fed. 2d 344.) The court said it was conceivable that the lobbyist tried to advance his cause by using improper influences on the city officials. But, it added, how far the possibility officials. But, it added, how far the possibility officials. But, it added, how far the possibility officials. that the lobbyist tried to advance his cause by using improper influences on the city officials. But, it added, how far the possibility or probability of improper pressure goes to outlaw these contracts, "must be decided with due regard for a clearly established policy to interfere with freedom of contract only when the reason for so doing outweighs the public benefit such freedom in general affords."

affords."

After reviewing numerous precedents, the court added: "The prevailing rule to be gathered from the above cases is that contingent agreements to endeavor to make sales to a governmental body are not offensive to public policy because of the mere possibility that sinister or corrupt influence may be used in the performance. There must be proof that something contrary to good morals was contemplated or done. Otherwise the policy that permits parties to make lawful contracts and requires them to perform or answer in damages for their breach is the one that controls. That will not allow this defendant to take the benefit of these contracts without discharging the obligations it assumed under them."

In a Georgia case, the Court of Appeals up-held the validity of an agreement by quarry

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owners to employ plaintiff for one year to sell gravel to the State, his compensation being 5 cents for every ton sold. There was nothing to show that his efforts were not exerted along legitimate salesmanship lines. (Cary v. Neel, 54 Ga., App. 860, 189 S.E. 575.) In a New York case, an executive order required government contracts to recite that no one had been employed to secure the contract. Nevertheless, it was decided that this fact did not justify a contractor in refusing to pay an agreed brokerage commission for securing a contract. (Singer v. Bruner-Ritter, Inc., 42 N. Y. Supp. 2d 881.)

However, there are many cases in which the courts have adjudged employment contracts to be void. For example, in a Tennessee case, plaintiff was employed to use personal and political influence with state officials to induce them to buy a particular kind of stone for state highway construction. The Supreme Court decided that plaintiff was not entitled

to collect agreed compensation based on tomnage of stone sold. The court said that, regardless of whether plaintiff had used any corrupt means in dealing with the highway authorities, his employment was against public policy because he concealed from them the fact that he was financially interested in sale of the stone. (Whitley v. White, 176 Tenn. 206, 140 S. W. 2d 157.)

Likewise, in a New York case, an employment contract was declared to be unenforceable because it contemplated the use of social and political influence with state officials in securing canal-construction jobs and favoritism in the performance of the contracts. (Drake v. Lauer, 86 N. Y. Supp. 986, affirmed by the Court of Appeals, 182 N. Y. 533, 75 N. E. 1120.) And in a New Jersey case, a similar contract for services in securing War Department construction contracts was held to be invalid, not because the contractor was incapable and ineligible for an award, but because social and political pressure on his behalf gave him an undue advantage over other bidders. (Wright v. Fissell, 92 N. J. Eq. 508, 113 Atl. 699.)

Engineer's Requirements Excessive on Wall Job

The Process: When the engineer required larger rock than called for by the spez, and required the rock to be shaped, was a

Government highway contractor entitled to allowance for increased cost of constructing an embankment wall?

The Answer: Yes, decided the United States Court of Claims. Pirst-Citizens Bank & Trust Co. v. United States, 76 Fed. Supp. 250.)

250.)
The contract called for "hand-laid rock embankment, Type B," at a unit price. The engineer's requirement of rock larger than called for by the spex necessitated the use of a crane. And the requirement, not covered by the spex, for shaping rock substantially increased the cost.

Inspector on Landscaping Job Judged Unreasonable

Job Judged Unreasonable
The Produce: Was a landscaping contractor
on a Federal housing project entitled to reimbursement for loss caused by the inspector,
who insisted upon personally supervising
the planting of each of 10,000 trees and
shrubs in a 45-block area?
The Answer: Yes, decided the United States,
74 Fed. Supp. 155.)
After noting that there was but one inspector and that the contractor was chargeable with \$25 per day liquidated damages
for delayed completion of the job, the court
said: "In the face of these facts the inspector
(Concluded on next page)



• The LIMA Type 604 shovel, crane and dragline is engineered to produce greatest capacity with minimum weight. This is achieved by placing as much weight as possible behind the center of rotation-eliminating the need for excessive counterweight. Hook rollers on which the machinery base revolves eliminate strain from the center pintle-permitting continuous, safe operation at full capacity.

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Lima Shovel and Crane Division CHAMILTON

Avoid **Legal Pitfalls**

(Continued from preceding page)

insisted on seeing every tree and shrub planted. If a tree was planted when he was not there he would require digging up and replanting. With two or more crews working, this caused idleness and extra expense. The plaintiff asked for more inspectors. This was refused. . . He was between the rock and the whiripool. If he went ahead and planted without walting for the personal presence of the inspector, he risked the ire of the inspector, . . . If he employed only one crew, he faced the assessment of liquidated damages."

Government Delays Job; Contractor Asks Damages

THE PROBLEM: A Government contract explicitly empowered the contracting officer to determine whether the contractor was liable for delayed completion of the job, if any. Did that imply power to determine whether or not the Government was liable for delaying the contractor?

the contractor?

THE ANSWES: No, decided the United States Court of Claims. (Anthony P. Miller, Inc., v. United States, 77 Fed. Supp. 209.)

The contractor was delayed through prolonged deliberations by the Government as to whether or not plans would be changed. The contracting officer denied a claim based upon that delay and the Government department head upheld the ruling. The Court of Claims decided that these rulings did not preclude the contractor from suing on the claim.

claim.

The court said that the contracting officer's "power under Article 9 is to determine whether liquidated damages shall be assessed against the contractor for late completion of his work, and not whether unliquidated damages shall be assessed against the Government for its breach of an express or implied obligation under the contract.

"If a contracting officer should award such damages against the Government, the Comptroller General would not allow them to be

paid, and contracting officers generally disclaim any power to award such damages or deny them. See B-W Construction Co. v. United States, 101 Ct. Cl. 748, 771. If we allow the adverse decision of the Contracting Officer to prevent us from considering such cases on their merits, we are reading Article 9 as giving the Contracting Officer the power to decide claims for damages for breach of contract against contractors, but no power to decide such claims in their favor. Such a reading would be unfair as well as irrational. What we have said applies also to the power given to the Head of the Department in Article 15 of the contract, to decide disputes on appeal."

Fair Labor Standards Act Applied to Airfield Job

The Problem: Certain employees of a contractor were engaged to extend and reconstruct naval airfield facilities. Were they so related to interstate commerce as to bring them within the overtime provisions of the Federal Fair Labor Standards Act?

Federal Fair Labor Standards Act?

The Answer: A draftsman engaged to correct the work of other draftsmen would be an "administrative employee" and therefore excluded from the Act. But it required a new hearing to determine whether other employees were covered. (Laudadio v. White Construction Co., 163 Fed. 2d 383, decided by the United States Circuit Court of Appeals, Second Circuit.)

The decision rested upon an assumption that interstate commerce would be involved.

the United States Circuit Court of Appeals, Second Circuit.)
The decision rested upon an assumption that interstate commerce would be involved. "If the Field were used solely to train air personnel of the Navy, it would seem to be an instrumentality of war rather than an instrumentality of commerce." But employees who maintain and repair facilities of interstate commerce are engaged in such commerce, and governed by the Act, depending upon the character of their own activity, rather than upon the nature of their employer's business.

As to whether employees who prepared bills of materials ordered from other states were covered by the Act, the court ruled that that depended upon whether the materials were necessarily procured from outside the state. The employees were not engaged in interstate commerce if the materials could be obtained within the state, although they might be secured from outside.

The Court said that more evidence as to the activities of draftsmen was needed to deter-



Bys-catcher in the Cayuga County, N. Y., Centennial Parade was this startling twosome from the present and past of earth-movers. The County's Gradall pulls a dirt wagon which is loaded with a slip-scraper and some hand tools commonly used in construction 100 years ago.

mine whether they were sufficiently related to interstate commerce to make the Act applicable. Referring to these employees, the court said: "In so far as the plaintiffs work consisted in preparing plans and bills of material for new buildings or for generally making over a small commercial airfield into a large naval air station, we do not think the work pertained to instrumentalities of commerce."

Texas Compensation Law Is Applied Outside State

The Problem: A Pennsylvania contractor operating throughout the country took a construction contract in Texas. He subscribed to the Texas Workmen's Compensation Act on December 10, 1945, and insured against his liability under that act for one year. One Evins was employed by the contractor on the Texas job, which was completed August 3, 1946. He continued in the contractor's employ in Pennsylvania and later in

West Virginia, where he died on September 4, 1946, of injuries sustained in the course of his employment there. The insurance remained in force until December 10, 1946. Evins did not expect to return to Texas within that time. Under the Texas statutes did he remain a Texas employee, in the sense that his dependent mother had a valid claim for an award under the compensation act, enforceable against the policy?

The Answer: Yes, decided the Texas Court of Civil Appeals, Waco. (Employers Mutual Liability Ins. Co. of Wisconsin v. Evins, 211 S. W. 2d 359.)

The court recognized that the contractor

S. W. 2d 359.)
The court recognized that the contractor could have terminated his liability under the Texas act and his liability for premiums on the policy by complying with certain provisions of the act, but this was not done. The court decided, also, that it was immaterial whether or not Evins was covered by either the Pennsylvania or West Virginia acts, because the Texas act permits recovery if rights under the laws of another state have not been enforced.



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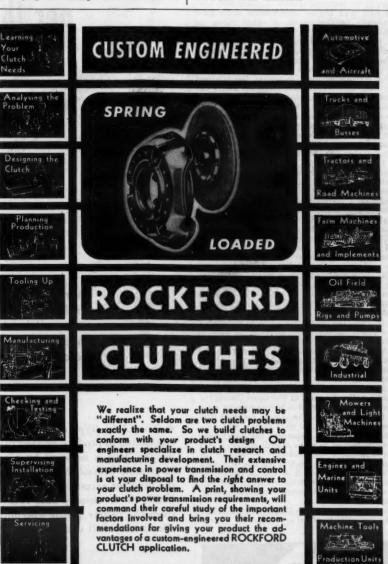
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ROCKFORD CLUTCH DIVISION

Research Board Holds 28th Annual Meeting

Results of Research Are Discussed in Washington During Four-Day Session; Presentation of Awards

+ THE 28th annual meeting of the Highway Research Board was held in Washington, D. C., from December 7 through December 10, 1948, at the building of the National Academy of Sciences and National Research Council. Registration for the four-day assembly totaled 901 persons who are actively interested in the technical features of highway construction and use. During the course of the meeting, 18 different sessions were held covering such varied highway subjects as soils, maintenance, roadside development, economics, finance, administration, materials, construction, design, traffic, and operations.

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operations.

At the first general meeting, the group was greeted by Dr. Raymond L. Zwemer, Executive Secretary, National Academy of Sciences and National Research Council. The convention was also welcomed by F. V. Reagel, Engineer of Materials, Missouri State Highway Department, who is 1948 Chairman of the Highway Research Board and a member of the Executive Committee. Mr. Reagel praised the work of the various committees which study specific projects and report the results of their research. "There are no better-qualified groups," stated the Chairman, "than these committees which transform research into practice."

Presentation of Awards

The Highway Research Board Award for the outstanding paper at last year's annual meeting was presented to C. R. Hanes, Field Engineer of the Ohio Department of Highways. The winning paper was entitled "Some Practices Used by Ohio in the Salvaging of Old Pavements". Mr. Hanes has been connected with the Construction Division of the Ohio Department of Highways for 25 years. He received his civil-engineering degree at Ohio State University where he was a member of Tau Beta Pi

Distinguished-service awards, which were established in 1948 for outstanding achievement in the field of highway research, were presented to Frank H. Jackson and Professor Charles H. Scholer. Mr. Jackson, a senior engineer of tests for the Public Roads Administration, has been employed 43 years by the Government. During all this time he has been actively engaged in research on the materials used in highway construction. Professor Scholer is Head of the Applied Mechanics Department of Kansas State College.

of Kansas State College.

The George S. Bartlett Award for outstanding service to highway transportation progress was given to G. Donald Kennedy, Vice President of the Automotive Safety Foundation. Mr. Kennedy, who lives in the District of Columbia, is a former Michigan State Highway Commissioner, and in 1941

was President of the American Association of State Highway Officials. He also served as Vice Chairman of the National Committee on Interregional Highways, which in 1944 submitted to the President and Congress a report that became the basis for the National System of Interstate Highways now being developed under the Federal-Aid Highway Program. Bartlett Award winners in previous years have included Paul G. Hoffman, now Head of the Economic Cooperation Administration; Robert Moses, New York City Park Commissioner; and Thomas H. MacDonald, Commissioner of the Public Roads Administration.

Soils

At this year's meeting more empha-

SHOVELS . DRAGLINES

sis was placed on soils than on any other phase of highway research. Three sessions were given over to the subject and 14 papers were presented and discussed. Jacob Feld, Consulting Engineer from New York City, made a significant contribution to the topic with his paper, "General Engineering Approach to the Classification and Identification of Soils". The paper outlined a classification of soils based on their measurable strains of elasticity, plasticity, and fluidity. Such a classification is based not on the constituents of the soil but on its qualities which determine its reaction to forces.

its reaction to forces.

According to Dr. Feld, the complete system will also require a study of foreign constituents and their effects. This will give the information necessary for artificial control of soils as well as for determining maximum deviations in strains under known forces. When these factors can be completely evaluated, the problem of soil classification and identification will be solved. Meanwhile, the paper outlines the gaps in informa-



Bee here, Fred! It's not THAT cold!"

tion and suggests research problems to fill such gaps.

Another paper on soils that was received with interest was "Military Road Construction in Foreign Theaters" by Lt. Col. H. E. Nelson, The Infantry School, Fort Benning. This paper stressed "Time Economy" as the watch-

(Continued on next page)



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Research Board Holds 28th Annual Meeting

(Continued from preceding page)

word of military construction. Adequate results, on time, are more important than any other consideration—quality of construction and acknowledged civilian practices often must be sacrificed for timeliness. Short cuts and new procedures must be used, such as air photography in route location, identification of soils, layout and job planning, location of materials, and prediction of trafficability; the adaptation of modern soil science and the packaging of soil-analysis sets for use by construction units; and constant watchfulness of civilian developments to make sure that the latest type of construction equipment is used.

Maintenance

A reminder that highway systems may never reach a state of perfection was advanced during one of the main-tenance sessions by C. Owen Beckley, Pennsylvania Department of Highways, in his paper "Economics of Resurfacing Disintegrated Pavements". Said Mr. Beckley, "Motorists are more interested in a smoother riding surface than in expensive corrections of profile and alignment. Our rehabilitation program has also enabled us to keep our maintenance within reasonable limits, because in most instances those pavements that were in such condition that they had to be resurfaced had deteriorated to the point where maintenance costs were almost prohibitive. It is our opin-ion that with the rapid increase in traffic volume and the demand for superhighways in urban areas and main state highways, the only way that the integrity of the state highway system can be preserved is the reclamation or salvaging of highways carrying com-

paratively smaller volumes of traffic.

"It is doubtful," Mr. Beckley concluded, "if our highway system will ever reach the point where we can say that it is adequate for traffic at all times . . . we are limited in funds, and also in the facilities—labor, equipment, and materials—in carrying out reconstruction programs that will keep our highway systems 100 per cent modern."

A paper of great practical value to maintenance engineers, entitled "Portland-Cement-Concrete Resurfacing of an Old Concrete Pavement in Georgia", was presented by W. F. Abercrombie of the State Highway Department of Georgia. In 1947 the Georgia State Highway Department resurfaced a 4.1-mile section of portland-cement concrete pavement which had been in place 25 years. As a considerable portion of the old road was on desirable grades and still in reasonably good condition, as much of the old pavement as possible was utilized by building a concrete surface. It was possible for the contractor to do the widening, resurfacing, and constructing of new sections in one continuous operation, using the same construction methods.

Roadside Development

At the Roadside Development Committee sessions, special attention was given to stabilized turf shoulders. A series of reports were presented on various aspects of shoulders—their stabilization, mulches and ground covers, turf culture, and the performance of stabilized turf shoulders on Long Island. The speakers stressed the value of stabilizing shoulders so they would have enough bearing capacity to accommodate, safely, cars forced off the pavement. And it was reported that turf can be economically established on shoulders which have been stabilized.

One of the new ideas presented to the group was that of the use of wood for soil improvement. In a paper on this subject, A. C. McIntyre, Chief, Regional Forestry Division, Soil Conser-

ration Service, Upper Darby, Pa., stated that wood is the cheapest soil-improvement material available and that the experience of farmers indicates that no toxic or detrimental effects result from introducing it into the soil. He also suggested the use of wood chips as an economical mulch, and described a portable machine which produces chips economically since it can be transported to the location of the wood to be cut up.

Other subjects covered in the papers included climatic factors as they affect roadside design, highway transitions in grading, and median-strip planting to control headlight glare. Various committees also made progress reports.

Materials and Construction

"Effect of Entraining Air on Bond

HIGH SPEED,

LONGER

HAULING

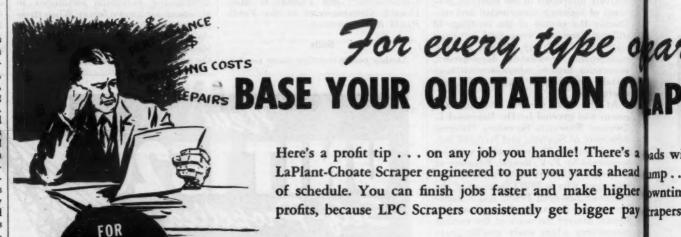
Strength of Concrete" was the title of a paper given by H. W. Russell, Illinois Division of Highways, during one of the sessions on materials and construction. This research project has shown that for both types of reinforcing bars when cast vertically, the bond for a specified slip was reduced by 10 per cent at 4.5 per cent of entrained air, when compared to non-air-entrained concrete. This reduction was about the same as the corresponding reduction in compressive strength and modulus of rupture of the concrete. For air contents above 4.5 per cent, the results for the two types of reinforcing bars were different.

For the horizontally cast bars, 4 per cent of entrained air caused practically no change in bond as compared to nonair-entrained concrete, except that in one case the bond increased. For an air entrainment over 4 per cent, however, a reduction in bond took place. This reduction in terms of the values at 4 per cent of air was 5 to 15 per cent for each per cent of entrained air over 4, while the compressive strength was reduced about 6.5 per cent for each per cent of air over 4.

An interesting contribution to the discussion of materials was advanced in the paper "Weathering Study of Some Virginia Aggregates" by P. L. Melville, Virginia Department of Highways. Mr. Melville said that an investigation of distressed sections of a surface-treated waterbound-macadam pavement brought to light the existence of a plas-

diff

(Concluded on next page)



Here's an earthmoving power-house designed to work at high speeds on every earthmoving job . . . in all kinds of material, on level or uneven ground, up and down steep grades. It's the LaPlant-Choate rubber-tired tractor-scraper combination that is big all over—Big capacity permits hauling 17½ heaped yards each trip . . . Powerful 225 H.P. supercharged diesel engine for fast acceleration and extra power . . . Big interchangeable tires for extra traction

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positive forced ejection with high lifting front apron for fast, positive unloading under all conditions; low center of gravity and low over-all weight, plus proper weight distribution and proper size tires for maximum flotation, stability and maneuverability; interchangeable parts and tires; easy accessibility for servicing with standard tools.

For the highest efficiency on your particular type of work, LaPlant-Choate Cable Scrapers are sized to fit your needs with 6, 8 or 14 struck yard capacity. tic layer immediately below the surface treatment. Yet the aggregate passed all the requirements of the current Virginia road specifications. This prompted a study of the weathering process for some typical aggregates.

An attempt was made to create an accelerated weathering test for aggregate in the laboratory. Altogether 13 different aggregates were investigated. The process consisted on the one hand of wet-grinding the stone in an ordinary ball-mill, and computing the percent of loss (i.e., the per cent passing the No. 40 sieve); and on the other hand, of testing the fines as a synthetic soil.

Record Federal Aid

"Progress of the Federal-Aid High-

way Program", title of a report by R. W. Kruser of the Public Roads Administration, revealed that construction put in place during the 12-month period ending September 30, 1948, totaled \$743,000,000, of which \$383,000,000 were Federal funds. The total cost of work done during the calendar year 1948 is estimated at \$770,000,000, and represents the largest dollar volume of highway construction put in place during a single calendar year in Federal-Ald history.

The active program on October 1, 1948, consisted of 11,155 separate projects ranging from the program-approval stage to the under-construction stage. It covered over 36,000 miles of highway construction estimated to cost \$1,935,-000,000, of which \$988,000,000 are Fed-

eral funds. This active program included 4,407 projects under construction at an estimated total cost of \$961,000,000, of which \$494,000,000 were Federal funds; it provided for the improvement of over 15,000 miles of roadway and bridges.

At one of the general meetings, Rex M. Whitton, Engineer of Maintenance, Missouri State Highway Department, discussed the "Missouri Method of Job Evaluation". According to Mr. Whitton, the salaries and wages paid to employees by the Missouri State Highway Department are based on a system of job evaluation developed by a committee of highway-department employees after a half-year study of industrial jobevaluation systems and other available data on methods of evaluating jobs.

This job-evaluation system, which is a combination of the point system and the factor-comparison system, makes use of five job factors for units of measurement. These factors are basic training, effort, responsibility, job conditions, and on-job training. The Missouri job-evaluation method had been giving satisfactory results for the past three years, and has received the almost unanimous approval of employees of the Highway Department.

One recent engineering-college graduate resigned from the Highway Department, Mr. Whitton admitted, because of inadequate salary—not his own, which he considered satisfactory, but that of a division engineer, which he thought should have been greater. The young engineer reasoned there was not enough salary incentive to remain in the Highway Department.

Sound-Motion Picture

A study of economics in the performance of heavy motor vehicles was presented in the form of a sound-motion picture at one of the general meetings. The picture was made through the cooperation of industry and government, and has resulted in a major contribution to both industry and the public in establishing the performance characteristics of various types of heavy trucks and combinations. The series of tests, referred to as the Pilot Study, were made in Pennsylvania over two different paralleling routes—the Pennsylvania Turnpike, and the route along U. S. 30 and 11. The former has maximum grades of 3 per cent, while the Federal highways have grades up to 13 per cent.

For purposes of initial comparison, a 26-mile stretch was taken on each route; both had the same starting and ending elevations. By operating heavy motor vehicles over these routes under controlled conditions, certain elements of direct cost expressed in terms of travel time and fuel consumption have been obtained. It will be some time before all phases of the study are analyzed, but the preliminary trends presented in the motion picture show an overwhelming balance in favor of the Turnpike with respect to time saved and economy of operation.

Highway economics was also discussed by Fred B. Farrell and Henry R. Paterick of the PRA in "Life Characteristics of Highway Surfaces". They reported that on January 1, 1940, the average age was 10.6 years for low-type surfaces, 8.2 years for intermediate-type, and 13.5 years for high-type surfaces. The remaining life expectancies of the miles in service were 4.5 years, 7.6 years, and 12.0 years for each type, respectively. Of mileages in service on January 1, 1946, they estimated that 94 per cent of low-type, 74 per cent of intermediate-type, and 44 per cent of high-type surfaces will require rebuilding by January 1, 1956.

Several aspects of highway design were also thoroughly discussed. Among

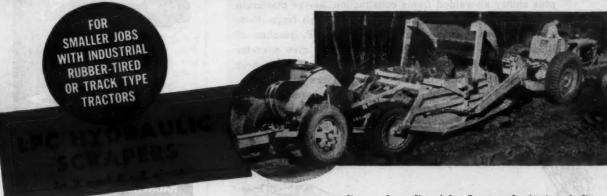
Several aspects of highway design were also thoroughly discussed. Among the papers on this subject was one entitled "Use of Reinforcement in Concrete Pavements" by R. R. Phillipe, Ohio River Division Laboratories of the Corps of Engineers, Department of the Army. The author presented the results of full-scale traffic tests on concrete pavements reinforced to degrees varying from normal-temperature steel to full structural quantities. The tests included full-scale traffic with wheel loads of 37,000, 60,000, and 150,000 pounds on designs presumed to be adequate for these loads. Comparisons were made also with non-reinforced pavements, tested under the same loads at the same time and at the same location.

It was concluded from the tests that the economic benefits of using reinforcement lie in the added life of pavement after the initial break, but that the added bearing capacity due to the presence of reinforcement is of doubtful economic value.

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LAPLANT CHOATE



A PAR Model 686-B 1½-yard ex-cavator is moving a 150-foot-high hill to make way for a fifth power plant for the Wisconsin Electric Power Co. at Port Washington

Hill Moved by Shovel

Excavation has begun for a fifth power plant for the Wisconsin Electric Co. at Port Washington, Wis. To make room for the new plant, it is necessary to move a 150-foot-high hill. This will call for the digging of about 300,000 yards of earth, much of it hardpan. Excavation will be to a depth of

40 feet below Lake Michigan. The excavation contractor, the R. B. Construc-tion Co., is using a P&H Model 655-B 1½-yard excavator and a P&H Model 255-A shovel on the job.

When completed, in 1951, the five power plants will have a power-gen-erating capacity of 400,000 kw. The third plant was completed in 1948, and the fourth unit is expected to be in operation this year.

Staff Changes for the PCA

Three changes in its research personnel have been made by the Portland Cement Association. F. R. McMillan has retired from active service with the Association as Assistant to the Vice President for Research and Development. Harrison F. Gonnerman, formerly Director of Research, has succeeded Mr. McMillan. And Hubert Woods, Research Director of the Riverside Cement Co. of Los Angeles, is named as the Director of Research for the

Officers for Carolina AGC

The Carolinas Branch of The Associated General Contractors of America, Inc., has announced its officers for the year. W. T. Potter of Greenville, was elected President to succeed R. H. Pinnix. Other officers are: N. K. Dickinson, Jr., Vice President; C. P. Street, Treasurer; and Robert Patten, Executive Secretary. Directors who were elected are E. D. Sloan, Hal S. Crain, C. N. Whilden, Eugene Skinner, Laurence C. Merchant, and William F. Bowe.

Hoists for Many Purposes

Multi-purpose hoists in a wide range of styles and sizes are the subject of a catalog issued by the Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa. The Joy hoists are available in models which can be powered by compressed air, electricity, or gasoline en-gines. They are designed for many types of work on construction projects.

Bulletin No. 76-X describes 7 compressed-air models, 8 electric models, and 2 gasoline models. Specifications listed for each of these models include the style number, horsepower, rope speed and load range, drum capacity, drum dimensions, weight, and overall

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 71.

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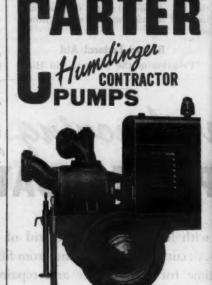
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Self-priming Centrifugals Single & Double Diaphragms

• Gasoline & Electric • 3000 GPH to 125,000 GPH

Every Humdinger is unconditionally guaranteed! You want continuous heavy-duty performance—with top fuel economy and zero maintenance . . . and that's exactly what Humdinger pumps deliver! What Humdinger pumps deliver! Carter's patented ball-priming device gives you positive priming and full pumping capacity—in 15 seconds; also prevents loss of capacities (eliminates by-pass)! Nationally sales and service sizes you

Nation-wide sales and service gives you 24-hr. trouble-shooting and technical advice anywhere.

Put a HUMDINGER on your next tough job—see how it steps up your perform-ance—while it cuts costs!



RALPH B. CARTER CO. HACKENSACK, NEW JERSEY

194 ATLANTIC STREET

MOVING? Be sure to give us we your old as well as your new

eddress.

Unless you do this you may skip on issue or two before the correction is made—and you won't want to be missing any issues of CONTRACTORS & ENGINEERS MONTHLY these days!

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BULLDOZING

Low initial investment and low operating costs.

plus sturdy all-welded frame construction, assure maximum blade performance with more traction through large diameter rear tires, utilizing the maximum 40 H.P. gasoline or Diesel engine. Finger-tip hydraulic controls give operator full control of blade. Direct application of hydraulic power on moldboard assures steady blade pressure at all times. Year 'round efficiency is achieved through easy mounting of bulldozer blade, scarifier, power sweeper and snow plow.

For additional information, contact the Meili-Blumberg Distributor in your territory, or write for Bulletin 141.

M-B TRAILERS





Hot-Mix for Paving Is Hauled 55 Miles

Contractor-Owned Fleet
Makes Haul Economical
In Resurfacing 1.8 Miles
Of Old Concrete Road

By MELVIN DEAN

+ AN asphalt-paving project for which the hot-mix material was transported by trucks for a distance of over 55 miles was recently completed by Good Roads Engineering & Contracting Co., Inc., of Wantagh, Long Island, N. Y. The job consisted of resurfacing 1.8 miles on Route 27 in Suffolk County. Route 27 connects points on southern Long Island with Montauk at the eastern tip of the island. The 1.8-mile section extends west from Southampton, and overlooks picturesque Shinnecock Bay for about a mile at its west end.

The project consisted of widening the existing 20-foot pavement to 24 feet, and trueing up the surface. The existing concrete pavement was so badly scored and cracked throughout its length that the most economical solution was to resurface the highway with asphaltic concrete by contract. The Good Roads Engineering & Contracting Co. submitted the low bid for use of the steam-dispersion method (Steamix). State plans call for eventual repaving and realignment of several sections of this road.

Widening

A trench 2 feet wide and 6 inches deep was dug on each side of the road by a Cleveland trenching machine equipped with 20-inch buckets. The trenches were filled with bluestone and fine-graded by a Caterpillar No. 12 motor grader. Asphalt was then applied by the penetration method in a ratio of 3 gallons of asphalt to a square yard of stone. It was also found necessary to change existing drainage in some cases, and to extend the culvert located on the north side of the pavement. Because the amount of excavation involved was small, it was paid for by the linear foot—an unusual procedure in New York State.

Two Courses

Preliminary work included filling up cracks and joints, and patching badly disintegrated concrete. The joints were dug out with picks to a depth of 2 inches, and were then filled in with mortar. The mortar used was a 1:1 mixture of portland cement and sand. The mixture used for the joints was also used for the cracks and holes. Because the pavement was caught in time, it was unnecessary to remove any sections of the concrete. The pavement was thoroughly washed and brushed to make certain that it would

USE RIGHT BUCKET
FOR THE JOB

Hayward makes all three—clamshell, electric motor, orange peel. A Hayward recommendation is unbiased.

Hauward Buckets

15

be free of oil or other materials which would lower its bonding qualities. No special curing or bonding compounds were used.

The surfacing material was laid in two courses—a binder course and a top course. The binder course averages 1¾ inches in thickness; the top course, ¾ inch. Slight differences in thickness of the courses as laid are caused by the self-leveling effect of the paving machine.

The asphaltic concrete was spread by a Barber-Greene Tamping-Leveling Finisher and compacted by two Buffalo-Springfield 10-ton rollers. Two compacting passes were made—one as a breakdown, and the other for back rolling. The paving was laid one lane at a time, and the entire base course



C. & E. M. Photo A Caterpillar No. 12 motor grader levels the stone base course in a widening trench on Boute 27 in Suffolk County, Long Island, N. T.

was finished before the top course was started. The paver was lined up by the foreman and an assistant, who laid a chalk line down the center of the road as finishing operations progressed.

as finishing operations progressed.

The job was completed with practically no center joint showing. When

compacting the first lane, the rollers would overhang the asphaltic material at the center by approximately 6 inches. And as soon as the second lane was laid, the roller followed immediately, this time, overlapping the joint by 6 (Concluded on next page)





C. & E. M. Photo

A. Barber - Greene Tamping - Leveling
Finisher lays hot. mix remarks. sher lays hot-mix resurfacing Bonte 27 on Long Island, N.Y.

Hot-Mix for Paving Is Hauled 55 Miles

(Continued from preceding page)

inches. The asphaltic concrete was feathered out at both ends of the job to meet the level of the existing pavement and prevent a ridge.

Long Hauls

The paving machine was fed by trucks which hauled the hot-mix material from the Islip plant of the Good Roads Engineering & Contracting Co. Material was dumped directly into the paver, with the speed of operations dependent upon the rate at which the material was delivered. The long haul was considered economical for two reasons: the contractor owned his own trucks, and the job mileage did not warrant setting up a plant in the immediate vicinity. On an average, 13 trucks, each with an average capacity of 11 yards, were used, and each truck made two hauls per 8-hour day.

During paving operations it was unnecessary to worry about traffic, as a suitable detour was located just north of the construction area. Local traffic was permitted on the road as soon as the asphaltic mix had set sufficiently often in half an hour or less. Rakes and shovels used by the asphalt workers were kept warm in a wheelbarrow in which an open fire burned.

Asphalt

The asphalt used had an 85-100 penetration and was supplied by Baker Asphalt Co. Typical weights of material used in a ton of the mix were:

Superior Quality BLADES AND CUTTING EDGES MANUFACTURING COMPANY

115 pounds of asphalt, 400 pounds of native sand, and 1,485 pounds of New York traprock stone. The nottom course was spread at the rate of a ton of mix per 10.2 square yards. The top course averaged a ton per 24 square yards Both courses combined averaged a ton per 7.2 square yards. A total of 3,500 tons of material was used on the job.

Gradation of the aggregate used in the mix is listed under New York

Specification No. 6-Steam-Dispersion Method.

Sieve	Size	Per Cent by Weight		
Passing	Retained	Binder Course	Top Course	
1-inch 34-inch 34-inch 34-inch No. 80	1-inch 14-inch 14-inch 19-inch No. 80	0-5 35-60 20-40 5-20 5-15 0-5	0-5 15-40 25-45 15-45 0-12	
Asphaltic cemen	t TATE	3-5	5.5-7	

Laying both courses required 15 working days. An average of 14 men vas employed exclusive of the truck drivers and supervisory personnel.



C. & E. M. Photo
Overhanging the asphaltic material at
the center by about 6 inches, a BuffaloSpringfield 10-ton roller compacts the
first lane on the Good Boads Engineering & Contracting Co. 1.8-mile contract.

W. G. Kennedy is Superintendent, and Oliver Weston is Foreman, for the Good Roads Engineering & Contracting Bertram D. Tallamy is Superintendent of the New York State Department of Public Works. J. J. Darcy is District Engineer in charge of District No. 10. M. C. Nemschick was New York State Engineer in charge on the job. Total cost of the project was \$69,885.83.

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Appointments by Hercules

The appointment of Milo A. Nice as Assistant Manager of the Technical Service Division of the Explosives De-partment is announced by Hercules Powder Co. Arthur H. Sibley succeeds Mr. Nice as Assistant Manager of the Explosives Department's New York

Hewitt-Robins Vice Pres.

Bernard H. McGuiness is now Vice President of the Robins Conveyors Division of Hewitt-Robins, Inc. He has been associated with the company since



MODEL INDUSTRIAL

One of the seven Engine models. Bos cubic inches Displa equipped with truck suction type fan, he air cleaner, carbur-type governor, oil eartridge, and 6-volt erally used in power mobile units, sawm Chrysler Industrial

7. Stroke 5". 331.4

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clutch housing, 20"
oil bath carburetor
th built-in velocity
fith removable type oil bath carburetor th built-in velocity ith removable type cal equipment. Gen-w shovels, industrial d air compressors. For dependable, economical, Chrysler-built

power in any industrial or agricultural appli-cation, see your Chrysler Industrial Engine -or write for information to . .

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HORSEPOWER WITH A PEDIGREE

Truck-Mixer Hauls Air-Entrained Mixes

A truck-mixer body for hauling airentrained concrete is announced by The Daybrook Hydraulic Corp. of Bowling Green, Ohio. Among the features claimed for the Hi-N-Lo body are selective discharge height, a 70-degree dumping angle, low overall height, and low center of gravity. According to the manufacturer, the Daybrook hoisting mechanism and the 4-foot discharge chute permit a variation in discharge height of from 6 inches to 7 feet 6 inches above the ground. The Hi-N-Lo body has an 8-foot length and can be mounted on standard short-wheelbase trucks.

The two elevating hoists and the one dumping hoist have been arranged so that a 19-inch mounting height from the top of the truck frame to the bottom of the body is obtained. In the low dumping position, the maximum height from



Selective discharge height and a 70-degree dumping angle feature the new Ri-M-Lo truck-mixer body for hauling airentrained concrete.

the ground to the top of the body, at a 70-degree dumping angle, is 12 feet 9 inches. The Hi-N-Lo body is designed

to handle up to 3 cubic yards of concrete; it has water-level capacity of slightly over 4 yards. A 4-foot extension chute is available to give a discharge length of 8 feet. The chute is fastened to the body on a swivel and follows the body to any dumping position. A center partition is designed to give

A center partition is designed to give the concrete another mixing action as it is discharged from the bottom of the body, and to help eliminate skimming. Control of the body is obtained by means of two levers located at the rear of the truck. A self-locking feature permits the operator to use only the valve lever required for the proper sequence of operations. A rotary shut-off valve controls the flow of the concrete. The center of gravity is so located, the manufacturer explains, that even with the body in the highest discharge point, it will remain well within the wheels of the truck.

Further information may be secured

from the company, or by using the enclosed Request Card. Circle No. 21.

Reo Field Man in Texas

Mac G. Dermody is the new Texas Field Representative for Reo Motors, Inc. Mr. Dermody resides at 138 Groveland Place, San Antonio, Texas.



For record-breaking performance...
for ease of operation, you can't top a
McCarthy Vertical Drill. Recently, on
one difficult job, workers using McCarthy equipment drilled an 8-inch
hole 100 feet deep in only 40 minutes!
The derrick is raised and lowered by
hydraulic power . . . finger tip controlled . . . and a 60 H. P. gasoline
motor is part of the standard equipment.

The McCarthy Vertical Drill, manufactured by The Salem Tool Co., is adaptable to high wall and key way drilling and diamond drill boring . . . drills 90% of all limestone and sand rock formations, and readily burrows through shale. Send today for complete information, and for a free copy of The Salem Tool Company booklet.

MINING EQUIPMENT SINCE 1901



THE SALEM TOOL COMPANY

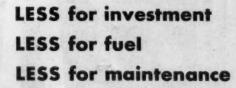


TO OPERATE A BARCO



For heavy pavement breaking, the Barco Model H-6B is recommended. It is the fastest, most powerful gasoline hammer ever developed.

Por all-around pavement breaking and demolition work, no other hammer does a more economical job than Barco. This portable, versatile slugger delivers more work, with lower operating and maintenance charges, permits work on projects that otherwise would not support the cost of breaking equipment. Drilling attachments are available. Many widely separated jobs can be carried on at the same time without heavy capital investment or costly transportation charges. In power, speed and portability, Barco has no superior. Write Barco Manufacturing Company, 1818 Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Canada.





The Barco Model J-2, is ideal for hard ground or for digging in rock which can be broken out without blasting.

BARCO

PORTABLE GASOLINE HAMMERS

BREAKING . DRILLING
DRIVING . TAMPING

FREE ENTERPRISE-THE CORNERSTONE OF AMERICAN PROSPERITY

Give generously to the American Overseas Aid-United Nations Appeal for Children



At left is a piece of reinforcing bar, hardened with El-Speed.It compound, which has been driven through a piece of cold steel. At right, wire and out sails, also hardened, have been driven through 14-inch steel.

Steel Is Hardened By a Simple Process

A compound for hardening low-carbon steels has been developed by the Necamp Metallurgical Laboratories and marketed through Wilson Carbon Co., Inc., 60 E. 42nd St., New York 17, N. Y. The Hi-Speed-It compound is recommended by the manufacturer for hardening the cutting edges of moil points, pavement breakers, earth drills, bucket teeth, bulldozer cutting edges, etc. It can also be used to make cutting tools and chisels out of reinforcing wire or low-carbon steels, to make high-speed cutting tools, and so forth. According to the manufacturer, these tools can be hardened to such a degree that they can be driven through spring steel, cold steel plate, and other tough metals.

No special equipment is needed for

No special equipment is needed for applying the Hi-Speed-It compound—only a source of heat. The compound is silver-gray in color and consists of a series of powdered metals and activated carbon combined with a catalyst. The purpose of the catalyst is to open the pores of the metal to allow the metallichardening elements to seep in. The manufacturer explains that Hi-Speed-It contains no cyanide nor other chemicals which would make it poisonous to handle.

In operation, the piece to be treated is heated to cherry-red and dipped into the powder. It is placed over heat again until the powder has partially fused with the treated surface. The tool is then quickly quenched. If deeper penetration is desired, the piece can be re-heated and re-fused with the powder before quenching. According to the manufacturer, the piece comes out of the quenching solution without any scale and with no distortion.

Further information on this product may be secured from the Wilson Carbon Co., Inc. Or use the enclosed Request Card. Circle No. 77.

Materials Can Be Nailed To Steel Framing Members

Steel framing members to which collateral materials can be attached with common nails are fabricated by the Stran-Steel Division of the Great Lakes Steel Corp., Penobscot Bldg., Detroit 26, Mich. Complete information about using and handling this nailable framing has been compiled in a 20-page catalog prepared by the company. The bulletin tells what Stran-Steel is, describes its features, explains methods of erection, and lists specifications.

erection, and lists specifications.

The catalog shows the dimensions of typical main members, including narrow and standard plates; half, narrow, and standard studs; and standard joists. Its photographs show the Stran-Steel members being installed on several types of buildings.

types of buildings.

A table of properties lists dimensions, gage number, thickness, area, weight, and moments of inertia, section moduli, and radius of gyration about the major and minor axes. Tables of safe loads are included for stud and channel sections used as beams or studs, and for Stran-Steel joists. The catalog also lists accessories designed to speed and simplify the erection of Stran-Steel members.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 29.

Absorptive Lining For Concrete Forms

An absorptive lining material for wood forms is manufactured by the Fir-Tex Insulating Board Co., 711 Equitable Bldg., Portland, Oreg. The material is described as a felted board, ½ inch thick, with a chemically treated surface designed to resist bonding. According to the manufacturer, the lining will absorb air and water bubbles forced to the surface of the concrete during vibration and initial setting. Its use is said to result in a smooth-textured surface of extreme density and resistance to moisture.

The Fir-Tex lining is attached to the

The Fir-Tex lining is attached to the forms by nailing. It is said to add to the form's rigidity, but not to its strength,

so standard bracing, wire ties, etc., are used. The forms are constructed in the usual way. After they are erected, the lining is nailed in place so as to make a snug fit; it should not be forced into place. Any standard mix can be used, the manufacturer states, and the forms should be stripped in 24 hours.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 35.

Light-Duty Tandem Roller

A variable-weight tandem roller is illustrated and described in an 8-page catalog issued by the C. H. & E. Mfg. Co., 3849 N. Palmer St., Milwaukee 12, Wis. This 3 to 4-ton unit has a variable speed range of from ½ to 3 mph. Fea-

tures of the Model 3-BA roller described in detail include the spur-andbevel-gear transmission, the location and method of operation of the controls, and the accessibility of the engine. M

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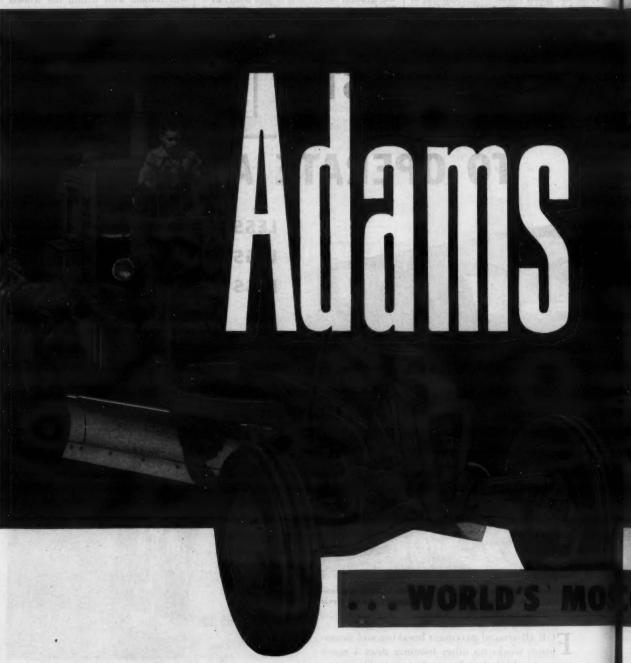
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Specifications listed in Bulletin RT-49 cover the steering and compression rolls, the frame, the 4-cylinder 20-hp gasoline engine, clutches and brakes, speeds and controls, axles, compressions per inch, dimensions, weights, and tank capacities. This bulletin also describes the C. H. & E. Mfg. Co.'s 3-ton tilting-platform trailer, and illustrates other construction equipment including pumps, saws, hoists, and bar cutters and benders.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 14.



Buy Right! Buy Adams! Choose your motor grader from the line that offers you models in the widest selection of sizes and prices.

Six models make up the Adams line. These range from the 31 hp. general utility machine to the big 100 hp. extra heavy-duty model. All are of the same proved design. All feature high blade lift, positive mechanical controls and a wide range of blade positions and operating speeds.

From largest to smallest, all Adams Motor Graders are capable of the same wide range of work, in proportion to their size and powereverything from ditching and bank cutting to a kinds of surface grading, mixing and road an street maintenance.

Highway official or contractor—big operate or small—there's an Adams Motor Grader with the *right* power and *right* capacity to meet you individual needs exactly.

For complete information on the World's M. Complete Line of Motor Graders, see your near-Adams dealer.

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live generously to the American Overseas Aid-United Astons Appeal for Unitdren

Model of River Aids In Planning Dam Job

A' model of the Godavari River in India has been built by the University of Minnesota. It is located at the University's St. Anthony Falls Hydraulic Laboratory on Hennepin Island in the Mississippi River, and it will be used to study the best method of controlling the Godavari during the construction of a concrete dam. Dr. L. G. Straub is Di-rector of the laboratory.

The dam is part of the Ramapada-

sagar project in the Province of Madras in southeastern India. It will impound a reservoir more than 100 miles long and will be used for power development and the irrigation of farm land. Cost of the project is estimated at \$257,000,- 000, but the increased production of food which is expected to result from the irrigation project will be about

\$100,000,000 annually.
The dam will be 428 feet high and 1½ miles long, and will contain 8,000,000 cubic yards of concrete. Approximately 20,000,000 cubic yards of earth will be excavated for the dam foundation. One of the most serious problems the engineers will face during construction of the dam is unwatering of the site. It will be necessary to divert the river to one side of the channel during the first stage of construction, and to the other side after the dam has been built to a level above the low-water stage of the river. The problem is especially acute because the excavation must extend 200 feet below the bed of the river to reach

adequate foundation for the dam

The experiments now under way are directed at determining the best layout for the cofferdams and temporary bar-ricades which will encircle the construction site and keep the river under control while excavation and early construction work is in progress. Even with modern methods and equipment, the dam will take an estimated 10 to 12 ars to build.

During its flood flows, the Godavari discharges as much as 2,000,000 cubic feet of water per second, or quantities as great as those of the lower Mississippi River at its highest stages. This flow is due to the high rainfall in southern India, which in some localities reaches an accumulative depth of 500 inches in one season.



The E-E saw attaches directly to electric or air drills or a fexible shaft for power. Its mechanism converts the rotary action of the power unit to a reciprocating mo-tion. Length of stroke is % inch.

Changes Drill to Saw

A saw or file attachment for use with electric or air drills is available from Anchor Mfg. Co., Inc., 2533 E. 73rd St., Chicago 49, Ill. The unit's mechanism is designed to convert the rotary motion of the power unit to the reciprocating

motion needed for a saw or file.

The E-Z saw is used with regular hack-saw blades, with special blades for heavy-cutting operations, or with a reg-ular machine file. It has an adjustable handle which can be turned and locked in any desired position, the manufac-turer points out. The length of stroke is % inch. The E-Z saw attachment can be supplied separately or with an electric or air drill.

Further information may be secured from the company, or by using the en-closed Request Card. Circle No. 23.

Blueprint Cabinets

Cabinets designed for safe, conven-ient, and orderly storing and filing of blueprints and drawings are available from the Empire Development Corp., 52 Broadway, New York 4, N. Y. According to the manufacturer, the Draw-In-Dex cabinet will handle 1,000

prints measuring up to 48 x 72 inches. As a feature of the cabinet, any print or drawing can be removed without disturbing the others. The prints are hung from specially designed suspension rods, and when the cabinet is opened, the hinges operate in such a way that the prints are easily accessible. The top of the cabinet lifts up, and the front pan swings forward for further ease. The cabinet measures 4 feet x 2 feet 6 inches x 20 inches. It is furnished with a lock

and index cards as standard equipment. Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 67.

ARBA Technical Bulletins

Five new technical bulletins have been issued by the American Road Builders' Association. Bulletin No. 139 is about planning activities in the District of Columbia, Maryland, and Virginia. No. 140 covers runway base con-struction with emulsified asphalt and sand. No. 147 is the report of the Com-mittee on Lime-Soil Stabilization. No. 148 deals with tar-soil stabilized base courses. No. 149 is on stabilization of soil bases. And No. 150, on upgrading of engineering personnel, was prepared by the Committee on the Advancement of Highway Engineering.

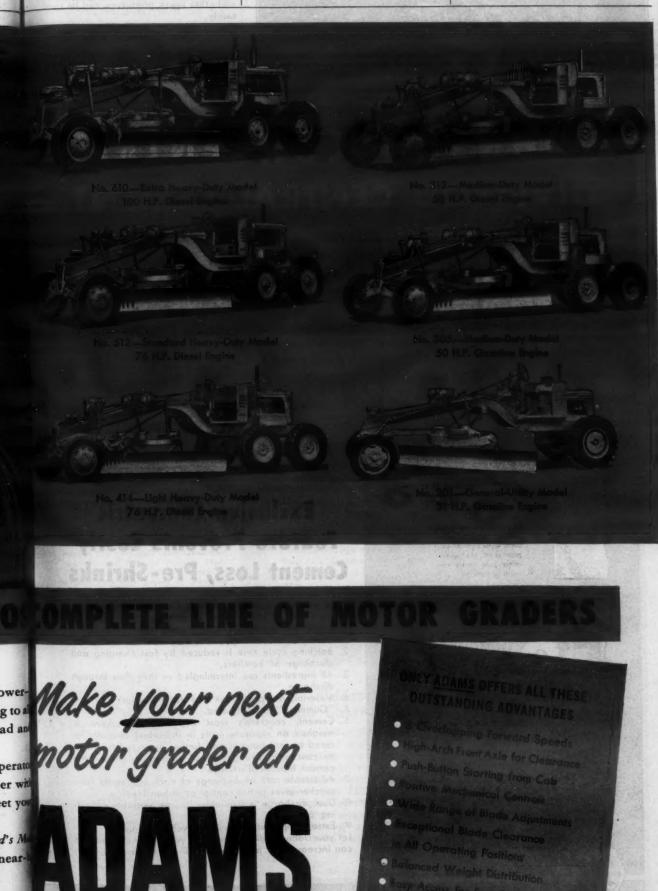
Each booklet contains reports pre-

pared by authorities in the field covered. Photographs and tables supplement the text.

Copies of these bulletins can be obtained by writing to the ARBA at 1319 F St., N. W., Washington 4, D. C.

Rubber-Products Warehouse

Raybestos-Manhattan, Inc., has opened a warehouse and office at 314 Occidental Ave., Seattle, Wash. The warehouse will carry a complete stock of industrial rubber products. It will be under the direction of Russell G. Heuman.



Job Fire Losses Are Preventable!

Common Sense Backed Up By Fire Extinguishers And a Few Preventive Steps Will Avert Blazes

> By MARIO DeMATTEO, Fire Protection Institute

+ FIRE losses in the United States in 1947 were the highest in the history of the country. In fact, the National Fire Protection Association reported that never in the history of any country had preventable fires destroyed or damaged so much valuable property in a single year. Homes, farms, schools, and factories burned in cities, towns, and villages; their blackened ruins totaled \$692,635,000 in fire losses.

Buildings burned even while they were being built, and the picture didn't change in 1948. Take, for example, the blaze that started early last year in a building under construction in Trenton, N. J. It started from a salamander which ignited tarpaulins protecting the rear of the four-story building. The flames traveled up the length of the tarpaulins and spread through the floors rapidly. The watchman, who failed to notify the fire department immediately, was burned to death attempting to fight the blaze alone. And when the fire was finally extinguished, damage had reached \$1,000,000.

Not only buildings, but bridges, tunnels

Not only buildings, but bridges, tunnels, and subways are susceptible to destructive fires in the course of construction. Such blazes when they are not extinguished in incipient stages can burn with the freedom seldom enjoyed in a completed fire-resistant structure. But there is much that can be done to protect a project from preventable fires. Common sense, backed up by approved fire extinguishers, can avert such losses. And with special consideration to site preparation, temporary buildings, fire protection, and effective round-the-clock guarding, the chances of getting a business call from a fire department will be lessened considerably.

Preventive Steps to Take

In preparing a site, contractors should make certain that brush, trees, and debris are removed. If possible, roads should be built to the project prior to construction operations. These would enable fire-fighting trucks to reach it without bogging down, in the event they are summoned. If open trenches surround the project they should be spanned with bridges at pre-determined locations, and the bridges should be strong enough to support fire trucks.

strong enough to support fire trucks.

Temporary buildings which are heated by dangerous methods and hastily wired for lighting offer a poor haven for valuable blueprints, job cost records, and essential documents. Contractors who use temporary buildings should take the time to make them at least reasonably safe from inherent fire hazards. It has been the practice of some contractors to group all temporary buildings which house offices, repair shops, paint rooms, and storage space. With this arrangement a fire in any one of the buildings can wipe out all the buildings if it is not checked and extinguished. Such small conflagrations can be avoided simply by spacing buildings at safe distances from each other.

A fire department within reasonable distance of a job is no guarantee that a serious fire cannot occur. The important thing in construction is to put out fires as soon as they are discovered. For this reason, it is advisable to have approved fire extinguishers in all areas of the construction. In the hands of trained men, they can quell a blaze be-



Acme Photo

Fire will treacherously attack anything that will burn—buildings under construction
not excluded. But sound fire prevention and practical fire protection can keep the
threat of fire at a distance.

fore it has a chance to spread to an uncontrollable bonfire. Approved fire extinguishers should be located in all temporary buildings as well as in 'the main construction.

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It is also wise to select a fire warden in the early stages of the job. His duties should include rigid inspection of firerisk areas, elimination of fire hazards, and correction of careless habits of employees.

Other steps that should be taken to avoid and prevent fires include the daily disposal of rubbish, scrap lumber, paper cement sacks, and other construction debris.

Every possible preventive measure should be taken during welding or cutting operations. With proper protection, this equipment, as well as rivet forges and other spark producers, can be used safely.

Chief Causes of Fires

According to a report made by the Factory Mutual Insurance Companies, (Concluded on next page)



two-thirds of the fires in buildings under construction originate from welding or cutting operations or salamanders. If smoking is included, these hazards account for three-quarters of construction fires. So make certain that coke is burned in salamanders rather than free-burning combustible materials that produce dangerous sparks. Then, too, if salamanders are solidly placed they will not topple over easily.

11

Careless smoking is dangerous. The fact that it is an outstanding cause of construction fires emphasizes the need for rigid regulations and curtailment of smoking on the job.

It is usually necessary to install a good deal of temporary wiring during construction, and the careful contractor will bear in mind that such wiring is far more likely to start a fire than permanent installations. With the use of cranes, shovels, trucks, and other construction equipment, it is necessary to provide adequate protection for wiring against mechanical damage. Experi-



Approved fire extinguishers in the hands of trained employees mean the difference between negligible and severe damage to construction projects. In addition to installing extinguishers around the construction area and in the structure being built, make certain that the men know how to use them.

porary wiring, and particular care should be taken to see that high-voltage circuits are well guarded against general abuse.

Proper handling and storage of flammable liquids cannot be overemphasized. Small quantities of flammable liquid should be stored in small safety

containers. The storage of larger quantities of flammable liquids should conform with local regulations.

form with local regulations.

The handling of heated tar deserves special care, for tar fires originating in tar kettles burn furiously and are difficult to extinguish. Moreover, other combustible material exposed to hot tar is subject to ignition also.

Contractors know the effect which exhaust from motors has on combustible material when the material is exposed to the hot gas for any length of time. With this in mind, they should locate gasoline-powered equipment such as air compressors, hoists, and pumps, so that their exhaust does not reach exposed areas of combustible material. If the equipment is used underground and the exhaust must be piped to the surface, don't place combustible material against the pipes—they get very hot. The use of electrically driven or compressed-air-powered equipment is recommended by fire-prevention experts for underground construction.

perts for underground construction.

These are the outstanding causes of fires in construction. There are others, too, usually grouped in the miscellaneous column. But all of the hazards have one thing in common; they can be eliminated or reduced. With a little additional effort, contractors will be reasonably safe from the threat of fire. And with approved fire extinguishers throughout the area they will be able to take care of the fire that starts from the salamander, the carelessly tossed cigarette, or the spark from a welding torch.

Today, while America is setting new records in construction, she is also setting new records in destruction by fire. Don't be a fall guy for a flame; be prepared for fire!

Diesel-Engine Bulletins

Three new bulletins have been released by Cummins Engine Co., Inc., Columbus, Ind. One describes the Cummins fuel system; another describes the application of Cummins diesels to equipment used in construction and materials handling; and the third one lists Cummins sales, service, and parts facilities throughout the world.

Bulletin 5275 uses colored diagrams and cut-away views to illustrate the flow of fuel through the Cummins engine, and to indicate how it is acted upon at each step. Fuel problems given special consideration are metering and distribution, preparation of the fuel charge before it enters the cylinder, and timing and controlling of injection.

Bulletin 5276 features job photographs of construction equipment powered by Cummins diesels—trucks, shovels, earth-movers, etc. Bulletin 6202-3 is a wall map of the United States on which each Cummins outlet has been indicated. Surrounding this map is a list of the names and addresses of 169 Cummins outlets in the United States and Canada. The bulletin also contains two hemispherical maps which give the location and addresses of Cummins dealers in Europe, Africa, Asia, Australia, Greenland, and South America.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. For Bulletin 5275, circle No. 18; for Bulletin 5276, circle No. 19; and for Bulletin 6202-3, circle No. 20.

Lincoln District Managers

Some new District Managers have been named by The Lincoln Electric Co. C. W. Lytton is District Manager for the Buffalo, N. Y., area. His office is located at 1700 Niagara St. C. M. Richardson is District Manager for the northwestern Pennsylvania district. His office is located at 741 Liberty St., Franklin, Pa. And Ray Zeh is appointed District Manager of the Toledo, Ohio, district. His office is located at 663 Spitzer Bldg., Toledo.



Expressway System

Depressed Urban Sections To Relieve Congestion in Downtown Traffic; 1.3-Mile **Contract Starts Project**

+ THE battle of Peachtree Creek and the six-week siege of Atlanta in the Civil War is described on stone markers grouped about the lawn surrounding Georgia's state capitol at Atlanta. One monument tells of the final days of the

Shells were thrown into the city where helpless women and children were exposed to this leaden hail of the On September 2, 1864, Sherman took possession of Atlanta and, having issued his merciless order [of eviction] to the inhabitants, within a few days thereafter he reduced the city

Following the burning by Sherman, Atlanta, in the days of Reconstruction, rose phoenix-like out of the ashes, but on the same ill-planned pattern of its original layout. Like most American cities, Atlanta grew without a plan of any kind. Its streets haphazardly crisss one another and sprawl about unfettered by any restraint or system. At the time of its rebirth Atlanta may have experienced some growing pains, but they have become worse instead of disappearing with age.

Key City of the Southeast

Now generally considered the capital of southeastern United States by reason of its position as a transportation center, Atlanta is bedeviled by the sins of its builders. Its population has increased steadily to 330,000 (1940), with about 500,000 living in the metropolitan area. Eight major railroads and nine airlines serve the city, together with sixteen state and Federal highways. Buses, trucks, and private automobiles operat-ing over these highways, as well as those within the city, all tend to make Atlanta one of the most traffic-congested cities in the country,

Atlanta is a hub, with main highways radiating from it like the spokes of a wheel. It cannot be conveniently bypassed by travelers. Traffic in its narrow downtown streets is slowed to a snail's pace, and there are no easy through routes in any direction. Even in the outskirts, a glance at a city map will show the same lack of skilled plan-ning. Like Topsy, these real-estate developments just "growed" without ning. Like Topsy developments just being integrated in any master plan of the city. Consequently traffic in the suburbs, too, is a growing problem.

With a look to the future, it is predicted that traffic flows in the 1965-1970 period will be more than 150 per cent of pre-war days. A 50 per cent increase in traffic would overload exist-ing streets unbearably. Accidents would increase and rush-hour speeds would drop to a crawl.

Highway Plan

To capitalize on its natural assets, Atlanta is planning to improve its high-way and transit facilities. A compre-hensive highway and transportation plan for the metropolitan area has already been prepared for the Georgia State Highway Department and the Public Roads Administration. The salient feature of this plan, with respect to vehicular transportation, was the recommendation to construct a system of expressways that would keep traffic moving about the metropolitan area. The expressways will be the urban portions of the interstate highways now entering the city. They will likewise be the logical starting point for the comprehensive planning of all future

Is Set Up for Atlanta

traffic and transportation improvements. The expressways will carry all types of highway traffic at reasonable speeds a high degree of safety. Access

will be limited, and interfering cross traffic eliminated. In the developed areas where cross streets are frequent, the expressways will be depressed, with the cross streets and railroad tracks carried over or under the new route.

Right-of-ways approximately 300 feet wide will be acquired which will permit flat slopes. These will be landscaped to give a park-like appearance to the entire improvement. Located in the Deep South, Atlanta is blessed with a long growing season which produces a great variety of flowering trees and bushes that will be grown on the side slopes.

For the present, the plan generally recommends four-lane divided road-ways on each of the expressway routes, and this is important—sufficient right-of-way is to be acquired on which to build a third lane in each direction when it is justified by the volume of traffic. Bridges are also to be constructed with this in mind. Traffic lanes in opposing directions will be separated by a broad center mall. In

the important downtown areas, the expressways will have two three-lane pavements at the start, with the third lane being, in effect, a continuous accelerating and decelerating lane.

Layout and Design

The expressway will have a total length of 32½ miles, including a Downtown Connector extending around the (Continued on next page)

BRILLIANT PERFORMANCE EVERY TRIP OUT



ALL TYPES AND SIZES

is Assured by DAVENPORT-FRINK SNO-PLOWS

No matter what the snow or ice conditions, you obtain FASTER • SAFER • CLEANER snow removal with the lighter, yet stronger, DAVENPORT-FRINK SNO-PLOWS. Available in "V" and Straight Blade types for all sizes of trucks, tractors, road patrols and locomotives. Once you see them at work, you know why they are engineer-preferred throughout the snow belt.

DAVENPORT, IOWA DAVENPORT BESLER CORPORATION

de in Eastern U.S.A. by CARL H. FRINK 1000 Islands, CLAYTON, NEW YORK



Here's the machine that's been sorely needed in scattered service trenching . . . it's the B-G Runabout Ditcher, driven from job to job by its operator at 15 m.p.h. Cutting 5½" wide and down to 4" deep, the Runabout offers ten cutting speeds for most efficiently meeting the local conditions. It has

proved its ability to cut through such difficult materials as frozen ground and bituminous pavement.

Mounted on pneumatic tires, this Ditcher is easy on walks and lawns, making it ideal for house connections. Simply raising the boom makes it

ready for travel. Requiring no trailer, the Ru is a completely one-man machine, establishing a new standard of economy in ditching for gas, telephone, water and power lines. It is ready for work at the next job upon arrival. No unleading, no adjustments, no conversion parts. Designed for simple operation and easy sarvicing the R.G. 705 simple operation and easy servicing, the B-G 705 Ditcher uses IHC-1-6 Tractor Components. For complete information about this and other B-G Ditchers, see your Barber-Greene Representative or write, Barber-Greene Company, Aurora, Illinois.



north, east, and south sides of the central business district. From this connector, routes will extend to the west: to the north, with a branch to the northeast; to the east; and to the south. They will all connect with interstate highways on the Federal system radiating out from Atlanta towards such other eading cities of the South as Spartan burg, S. C.; Chattanooga, Tenn.; Mont-gomery and Birmingham, Ala.; and and Augusta, Ga.

At the intersection of the various expressway routes, interchanges are planned. These will be of the directional type for the more important movements of traffic. Connections to the local street system will be provided at frequent intervals by ramps joining the expressways with parallel one-way service drives or with cross streets.

All paved lanes of the expressway will be 12 feet wide, flanked by a 10-foot stabilized shoulder on the righthand side. Design standards of 50 mph were used for downtown expressway ns, but these were increas 60 mph in the outlying sections of the routes. Horizontal curves are held to a 7-degree maximum, while the maximum grade on the vertical alignment is 5 per cent. On the ramps this increased to 6 per cent for up traffic, and 8 per cent for down traffic. Ramp ents are at least 16 feet wide. All structures will have a 14-foot vertical clearance.

Financing

The estimated cost of the 321/2 miles of expressway is placed at \$48,000,000. Of this amount \$13,000,000 will go for right-of-way, while the remaining \$35,000,000 will be the cost of construction. The city of Atlanta and Fulton County will provide the right-of-way. Federal, state, city, and county money will finance the construction.

For the most part, the expressway is laid out to pass through blighted, substandard, slum-ridden areas in which right-of-way can be purchased at the least possible cost. The expressway is expected to rejuvenate these most depreciated and least attractive areas of the city, and might well be considered a slum-clearance project.

is expected that Federal funds will be available for the improvement as part of the aid program to urban-area highways. A reasonable allocation of state highway funds will likewise be forthcoming, no doubt. The bonding power of the local governmental agencies, city and county, will also be counted on to help finance the project. The cost of the improvement may also be shared through taxes by the property owners as well as the motorists; for the benefit of these transportation facilities will be felt by the city and environs as well as by the operators and passengers of motor vehicles. They will add to the wealth of the area and make for more pleasant

Allied Improvements

Along with the expressway, the highway and transportation plan calls for operational improvements of exist-ing traffic facilities on the local streets. While it is estimated that 60 per cent of travel with downtown destinations will eventually use the expressway, the present street system is entirely unsuited to the needs of modern automotive traffic. An arterial street system will be extended into the metropolitan area in advance of future development. A network of streets has been selected for gradual improvements through widening and the elimination of jogs, separation of grades, and preferential treatment in traffic control. These major street improvements will cost approximately \$13,000,000.

The plan also recommends grade separations where railroads cross so of the major streets in Atlanta. Too much for any report, plan, or survey to

8

solve, the parking problem was disposed of with a suggestion to the city to encourage additional off-street parking facilities.

The transit system would be improved by having express buses operate over all the proposed expressways. This would provide fast public transportation between the central business district and the various parts of the city and outlying areas. Substantial savings in time would thus be effected, and the local streets would be relieved of a large volume of bus traffic. A new bus terminal is also proposed for the heart of the business district, to be constructed above the railroad tracks south of Marietta Street between Forsyth and Broad Streets. This would remove many buses from the streets since they would pick up passengers at the terminal instead of having to park along the curbs in great numbers.

Atlanta's two railroad passenger terminals should be merged into one, according to the study. A site for a single union passenger station was suggested, and if this were adopted the heavy transferring of passengers and goods between stations could be elimi-

Executing the Plans

So far, the city and county have done a little work on the street system in accordance with the metropolitan study and suggestions. Plans and surveys are complete, but no construction has begun on the expressway as yet. The initial contract will be for a 1.297-mile increment on the north section of the expressway between North Avenue and Brookwood Station. A contract for this section has been awarded to the Mac-Dougald Construction Co. of Atlanta, at an estimated cost of \$1,327,500. This section will consist of six depre lanes with grade separations at North Avenue, Fifth Street, Tenth Street, and Fourteenth Street.

Following that, the northeast and northwest legs will be built, then the Downtown Connector, the section to the south, and finally the east and west portions of the expressway. The entire program is estimated to take from 10 to 12 years to complete.

The highway and transportation plan for Atlanta was prepared by H. (Concluded on next page)



25 yards struck capacity, 78,000 lb. payload Diesel engine to 275 h.p. rating Loaded top speeds to 24.1 m.p.h. Hydraulic booster steer is standard equipment Comfortable driver's seat with shock absorber

Big 27.00 x 33 tires on

drive and trailer wheels

height and wide hopper facilitate loading by big shovels, draglines, overhead hoppers, and the Euclid Loader. Short wheel base of tractor and the universal hitch design permit short turns and assure easy handling.

Big tires on drive and trailer wheels - size 27.00 x 33 provide good traction and flotation for steep grades and soft fills. Hydraulic booster steering reduces driver effort and gives positive control in tough going. A form fitting driver's seat with hydraulic shock absorber affords good riding comfort on rough roads . . . is adjustable for driver's weight and position.

Engineered for endurance, this husky Euclid hauls big loads at high speeds...pays off in better profits and all-around economy.

SEE OR WRITE YOUR EUCLID DISTRIBUTOR FOR COMPLETE INFORMATION ON THIS NEW MODEL LDT BOTTOM-DUMP EUCLID

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio





"Mow the hell did you get on here?"

Expressway System Is Set Up for Atlanta

(Continued from preceding page)

Lochner & Co. and DeLeuw, Cather & Co., both of Chicago, Ill. W. Earle Andrews of Andrews & Clark, Engineers, New York City, acted as consultant on the expressway portion of the plan. The Division of Highway Planning of the State Highway Department, under the direction of Roy A. Flynt, made all traffic investigations and compiled data used by the consultant in preparing the highway and transportation plan.

The interests of the Georgia State Highway Department in the expressway are represented by J. H. Archer, Urban Engineer, and Charles F. Bond, Assistant Urban Engineer. J. C. Beasley is Director of the Department, with W. R. Neel as State Highway

Engineer.
The Joint Bond Commission, which represents all the agencies involved in the Atlanta plan, is headed by Col. M. E. Cox, Executive Secretary and Engineer, and a former engineer of the State Highway Department.

A Slide-Rule Watch

A combined watch and slide rule is available from Juvenia Watch Agency, Inc., 604 Fifth Ave., New York 22, N. Y. As a special feature of the Juvenia Arithmo watch, all figures are read in their normal position as the slide rule is revolved. Turning the rim into which the watch crystal is set rotates the slide index until it is opposite the 12. It remains there as long as the rim is revolved in the same direction. It starts in the opposite direction as soon as the rim is turned the other way.

The Arithmo watch has a 17-jewel Swiss movement, and the circular-type slide rule is precision-manufactured. The watch can be supplied with a polished stainless-steel case or in 18-karat gold.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 69.

Spreaders for Highway Use

A folder which gives complete details on four models of highway spreaders has been prepared by Highway Equipment Co., Inc., 601 D Ave., N. W. Cedar Rapids, Iowa. These include the Models R, DD, A, and E. The Hi-Way spreaders are designed for spreading aggregates, laying seal coats, distributing ice-control materials, etc.

The folder illustrates each model and tells how it is connected to or mounted on the carrying truck. Close-up photographs illustrate the parts of the various spreaders, and text describes their features of operation. Specifications cover the power supply, type of feed, method of spread, sizes in which each model can be furnished, and parts such as distributor disks and hoppers.

as distributor disks and hoppers.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 45.

Connectors for Wire Rope

A 32-page catalog on a complete line of wire-rope connectors has been released by the Electroline Co., 4121 S. La Salle St., Chicago 9, Ill. It features cut-away drawings which show how the Electroline-Fiege connectors are designed to grasp the wire rope and to hold it securely.

to hold it securely.

Three main types of connectors are illustrated: open-end or clevis type, eye-end type, and stud-end type. Also listed are couplings, oval-eye sockets, open-body turnbuckles, open-body double-socket turnbuckles, single and double-socket loops, swivels, rigging toggles, swivel hooks, and others. The catalog includes the various types of center plugs used with the Electroline-Fiege connectors, and shows how they anchor the rope strands. Also described is the inspection hole designed to permit a rapid inspection of the connection.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 72.

HOT or COLD Mix Asphalt

DUST
COLLECTORS
AIR WASHERS
ASPHALT
TANKS

OIL TANKS



FEEDERS DRYERS

MIXERS

BOILERS

OIL BURNERS

DEPENDABLE

THE SIMPLICITY SYSTEM COMPANY CHATTANOOGA, TENNESSEE, U.S.A.



"Truck-killer" hauls that call for sustained low-gear operation are made to order for the new Model 4-A-112 Fuller Transmission—a four-speed version of Fuller's extra-large, heavy-duty "1120" series. Model 4-A-112 is the outgrowth of Fuller's success with its five-speed Model 5-A-1120.

Helical gears in all forward ratios give Model 4-A-112 capacity to operate in low for long periods of time. The high capacity of helical gears results from the large tooth areas which are always in contact.

Gears in Model 4-A-112 are engaged easily by sliding clutches . . . large bearings insure long, trouble-free operation.

Used with a three-speed Fuller Auxiliary, it gives you high capacity, long wear-life, easy shifts and quiet operation through as many as 12 forward and three reverse speeds.

FULLER MANUFACTURING COMPANY, TRANSMISSION DIVISION
KALAMAZOO 13F, MICHIGAN

Unit Drop Forge Division, Milwaukee 1, Wisconsin

WESTERN DISTRICT OFFICE (SALES & SERVICE)
1060 East 11th Street, Oakland & California





The principal improvement of the new Model C Wagnermobile Scoop is the addition of planetary drive gears to each of the drive wheels.

New, Improved Loader Has Planetary Drive

An improved Model C Wagnermobile Scoop is announced by Mixermobile Manufacturers, 6855 N. E. Halsey St., Portland 16, Oreg. The Wagnermobile Scoop features the addition of planetary drive gears to each of the drive wheels. The axle thus drives these gears and transmits power at a gear reduction of 3 to 1, the manufacturer explains. Disengaging the planetary drive permits the Scoop to be towed at speeds of over 20 mph.

Other improvements claimed for the Model C Scoop include wider chassis, roomier cab, safety glass, shorter turning radius, simplified hoist control, 600-pound counterweight, and a closing-bucket type of loading action. The unit is mounted on three 10:00 x 20 single tires.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 28.

Form-Fabrication Service For Special Construction

Steel forms for use in all types of concrete construction are fabricated by the Concrete Forms Corp., 43 Cedar St., New York, N. Y. And an 8-page catalog of pictures showing several jobs on which the Atlas forms have been used is now available from the company. Projects illustrated include pier forms for the Potomac River Bridge; highway-bridge piers measuring 128 feet high with an 11-foot base diameter and a 5-foot top diameter, for use on Route 40 in Pennsylvania; forms for the Bronx-Whitestone Bridge in New York City; caissons for the Somerville shaft at Boston; and subway and traveling sewer forms.

The catalog contains a 2-page spread on the Atlas Speed forms for use in wall and floor construction, and it describes concrete-pipe forms and special form and steel-plate work which can be fabricated by the Concrete Forms Corp.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 15.

A-W Graders in England

The Austin-Western Co. of Aurora, Ill., and Aveling-Barford, Ltd., Grantham, England, have linked their interests and formed a new English company to be known as Aveling-Austin, Ltd. The new company will market Austin-Western Model 99-H power graders chiefly throughout the Sterling areas.

GRIFFIN WELLPOINT SYSTEMS JETTING PUMPS

GRIFFIN WELLPOINT CORP.

881 E. 141st ST., NEW YORK 54, N.Y.
TEL. ME. 5-7704

The graders will be manufactured by Aveling-Barford. Plans and tools are being converted to British standards, and actual production is expected to start late in 1949.

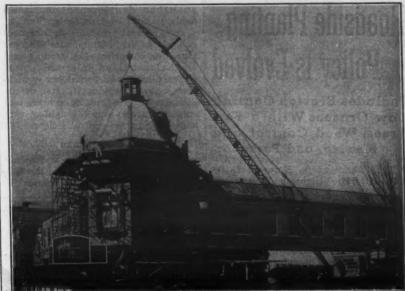
Clam, Dragline Buckets

Clam and dragline buckets are described in a folder issued by The Wellman Engineering Co., 7012 Central Ave., Cleveland 4, Ohio. Five types of Williams buckets are listed in this bulletin: multiple-rope rehandlers, powerarm rehandlers, multiple-rope diggers, power-arm diggers, and dragline buckets. Wellman-appointed distributors for the Williams line are also listed.

Each type of bucket is illustrated, and a brief description covers the type of construction, principal features, and kinds of work for which each is best suited. The folder also lists the descriptive bulletins available.

tive bulletins available.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 11.



Using a 95-foot boom, this 20-ton Lorain Moto-Crane erects a cupols on the Country

"Our FORD F-7 does the job with POWER to spare!"



Roadside Report

"THIS TIME we graduated into the big truck class with a Bonus Built Ford F-7 Big Job," writes E. H. Holtzen of Enid, Oklahoma. "Our Ford F-7 does the job with power to spare, and we can understand what you mean by 'Bonus Built.' Our costs have been negligible, and our gas mileage is very economical."

With Mr. Holtzen, as with thousands of other extra heavy duty truck users, the new Ford 145-horsepower Big Jobs are all the go! One reason why...engine power second to none in its class. Second reason... the luxury of the new Ford Million Dollar Cab. Third reason... Bonus Built construction, a feature of every one of over 139 Ford Truck models. Bonus Built is the superstrong construction that contributes to long truck life. Life insurance experts prove Ford Trucks last longer!



BUILT STRONGER TO LAST LONGER

USING LATEST REGISTRATION DATA ON 5,444,000 TRUCKS, LIFE INSURANCE EXPERTS PROVE FORD TRUCKS LAST LONGER!

ONLY THE FORD BIG JOB

- New 145-h.p. Ford V-8 engine for top performance
- * Ford exclusive concentric dual-threat carbureter for more power, more economy.
- ★ New heavy duty 5-spood transmissions for operating flexibility.
- ★ Big Ford rear brakes for sure-footed stopping; 16-inch by 5-inch in the F-8.
- Ford Super Quadrax 2-speed axle with vacuum shift for performance flexibility in Model F-8 (single speed axle also available); single-speed Quadrax Hypoid Axle in Model F-7.
- * Large diameter (10-inch) wheel bolt circle with 8 studs to allow for extra-strong hub construction.
- * Million Dollar Cab with Ford Exclusive Level Action suspension for greater driving comfort.
- * Nationwide service from over 6,400 Ford Dealers
- * Ford Bonus Built construction for long truck life.

Grass Vehicle Weight Ratings: F-8 up to 27,500 fbs., F-7 up to 19,000 fbs. Grass combination ratings: F-8 up to 39,000 fbs., F-7 up to 35,000 fbs.

Roadside Planting Policy Is Evolved

Includes Erosion Control, Low Grasses With a Few Trees, Weed Control and Mowing, and Parks

+ THE Maintenance Bureau of the Missouri State Highway Department recently issued a clear-cut written statement of its roadside-development policy. The statement was made in inter-Department correspondence addressed to all division engineers. It was prompted by the numerous inquiries from citizens and organizations interested in roadside planting. It not only expresses present policy but outlines the development and reasons for that policy.

Learning From Experience

Roadside development, or "beautification" as it was first termed, was started in a small way on Missouri highways in the early 1930's. The succeeding years saw a good deal of land-scaping with trees, shrubs, and flowering plants—much of it carried out in cooperation with garden clubs and civic organizations.

Then, in the early 1940's and during the war, it became necessary to limit and finally stop altogether such road-side planting and "beautification". Work of that type was classed as non-essential because the Department was short on money and personnel and had to turn all its efforts to roadway surface

and drainage.

But it had learned a lot from its early roadside-development work. It had learned that plantings—even though furnished and placed originally by local organizations—still have to be watered, trimmed, protected, and maintained by the Highway Department. Moreover, those plantings increase the cost even of routine maintenance operations such as right-of-way mowing. The Department has now mechanized its maintenance methods whenever possible, as an economy measure and for better results.

sults.

The Department also saw many of its right-of-way plantings destroyed when utilities such as sewers and conduits, or telephone, telegraph, and power lines were constructed. Many of the plantings had to be removed to provide entrances to commercial and resident areas which grew up adjacent to highway right-of-ways at the edges of towns and cities. Roadside fires and vandalism destroyed many expensive plantings. Pests and disease added their toll in destruction, or required expensive maintenance methods for their control.

Finally, the Department found that public opinion has a bearing on road-side development. Citizens who live on unimproved roads believe that high-way money should be spent to build more roads rather than to make plantings along existing roads. And since there is no way for these citizens to distinguish between plantings furnished and placed at the cost of the local people, and those furnished and placed by the Department, the Department received the criticism in either case.

Present Policy

The Maintenance Bureau now believes that the best type of roadside planting consists of low-growing grasses, interspersed with occasional native trees found in place or allowed to grow by selective clearing. It has received no criticism on this type of improvement because it blends with any kind of adjacent property no matter whether it is suburban development, cultivated fields, pasture land, or timber land.

The present roadside-development policy of the Maintenance Bureau therefore comprises (1) grading and erosion control on in-slopes, downslopes, ditches, and backslopes so as to permit power mowing; (2) the establishment of low-growing grasses and occasional trees; plus (3) right-of-way mowing and weed control.

Roadside Parks

Work on roadside parks and scenic turnouts was also discontinued through the war years. But the Department is now beginning to establish them again in a limited way, and has set forth a

definite procedure.

First, the land must be furnished free of cost to the Department. It may be deeded outright or secured by a long-time roadside-park easement. In all cases, the Department's right-of-way engineers draw up the necessary legal papers and handle the transfer of property.

Selecting the location is very important. Park entrances and exits must be at locations with a good view of the highway. A scenic view from the park is highly desirable. Established shade trees are another requisite for a park that will be extensively used. Proper drainage of the land must be considered. And a location that can be secured has to be approved by the division office and the headquarters office in Jefferson City.

Special plantings of trees, flowers, or shrubbery are financed by the sponsors, though the Department furnishes supervision. It sometimes furnishes fireplaces, benches, and picnic tables where they are essential. But the sponsors must furnish the material for these appurtenances at locations where the

(Concluded on next page)



MOST POWERFUL MOTOR GRADER
IN ITS CLASS
78 BRAKE HP. — 19,042 LBS.
2-Cycle GM Diesel Engine

A CONSTRUCTION MACHINE THROUGH AND THROUGH
Handles every type of grading on road or
street construction—builds ditches, cuts backslopes, removes sod, shapes up and finishes
surface . . . scarifies, mixes blacktop, plows
snow.

FAST, HIGHLY MANEUVERABLE

A-W Graders in England

• Six Forward Speeds — 23 ... Three Reverse — 2.64

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- Travel speeds smoothly operator controls . . . all applied as required.
- Easier to steer and manew of job — shorter turning ideal for narrow roads an

*OTHER ALLIS-CHALMERS DIESEL-POWERED MOTOR GRADERS

AD-4, 104 Brake hp. . . . 22,140 lbs. AD-3, 78 Brake hp. 21,835 lbs. BD-2, 50.5 Brake hp. 17,772 lbs.

Department does not consider them essential. When the sponsors do furnish such materials, the Department supervises their construction and erection. It also retains basic control of all such installations to keep the park from

being cluttered with structures.

Sponsors furnish any historical or memorial tablets or stone monuments. The name of the park is selected by mutual agreement between the sponsors, if any, and the Department. In many cases it has been found that using a local name for the park has actually been a help in securing right-of-way and funds for its development.

N. Y. Highway Dept. News

J. Frank O'Marah has retired as Director of the Bureau of Rights of Way and Claims of the New York State Department of Public Works. He has been in charge of land procurement for the State and the settlement of all claims against the State in which the

Department was an interested party.
Mr. O'Marah was awarded an illuminated scroll for distinguished public service, by the American Association of State Highway Officials; and a De-partment of Public Works service pin. He had been in State service since 1897.

Named to succeed him is E. Burton Hughes who served as his assistant for

the past two years.

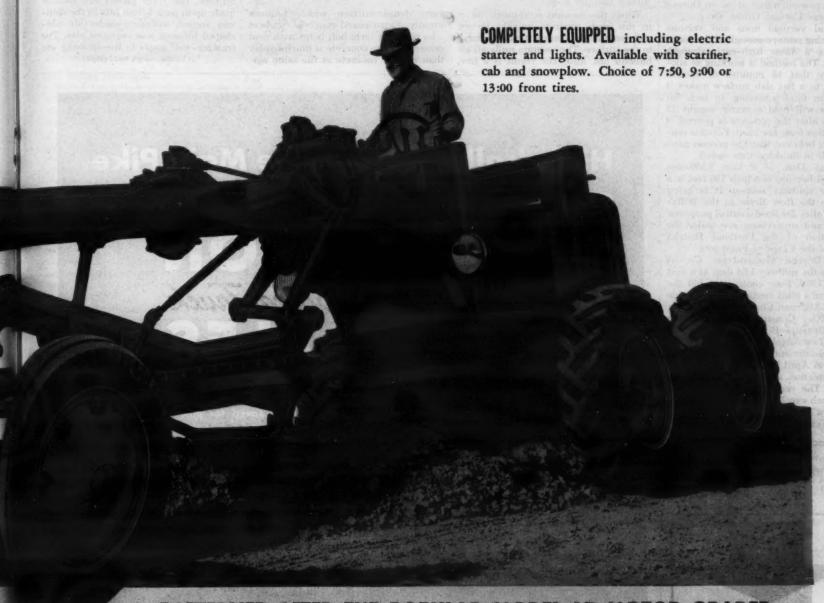
Earl F. Bennett has resigned as Director of the Bureau of Soil Mechanics in order to enter private employment. George W. McAlpin, Jr., Associate Soils Engineer, has been given a provisional appointment as Mr. Bennett's successor ending establishment of a civil-service list for the post.

Light, Flexible Air Hose

A 4-page broadside on the Highflex lightweight air hose has been prepared by The B. F. Goodrich Co., Akron 18, Ohio. Highflex hose is for use with small pneumatic tools, and is said to feature extreme light weight coupled with flexibility and strength.

The catalog explains the construction of the cover, reinforcement, and tube; compares the weight of Highflex hose to that of other types of hose; and shows photographs of the hose in use to illustrate its flexibility. The catalog also lists Highflex stock sizes available, which include 3/16 1/4 5/16 3/4 and 1/4 inch

include 3/16, ¼, 5/16, ¾, and ½-inch. Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 68.



PATTERNED AFTER THE POPULAR MODEL AD MOTOR GRADER

STRONG — exclusive tubular frame . . . absorbs shocks, protects control rods inside frame.

ACCURATE - cuts smoothly, blade held firmly on road through direct down pressure.

HIGH CLEARANCE - 28" throat clearance for handling bigger windrows without interference.

"ROLL-AWAY" MOLDBOARD — less power required to handle bigger windrows at faster speeds. Material is rolled, not pushed.

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Concrete Hardened By Vacuum Process

Faces Exposed to Water On Dorena Dam Spillway Are Case-Hardened by Vacuum-Suction Method

By RAYMOND P. DAY, Western Editor

(Photo on page 1)

+ THEY put water in the concrete to mix and place it. Then they suck part of the water out of the material to ca harden the surface quickly. That is the gist of the 8-year-old vacuum concrete process now currently in use on Dorena Dam, near Cottage Grove, Oreg.

Special vacuum mats and vacuum form lining remove enough of the water to make a dense high-early-strength surface. The method is working so successfully that 15 minutes of suction applied to a flat slab surface makes it dy for final troweling. In fact, flat surfaces will hold a man's weight 15 minutes after the concrete is poured, if the suction mats are used. For this reason, it is believed that the process pays for itself in finishing time saved.

Dorena Dam is a new 3,500-foot earth-fill barrier, of which 750 feet is a concrete spillway section. It is being built on the Row River in the Willamette Valley for flood-control purposes. Design and supervision are under the jurisdiction of the Portland District

Office of the Corps of Engineers.

The Dorena Construction Co. building the spillway and dam at a cost of \$7,737,570. Four contractors bid the big job on a joint venture. They include Guy F. Atkinson Co. of San Francisco, W. E. Kier Construction Co. of San Diego, Bressi & Bevanda Constructors, Inc., of Los Angeles, and A. Teichert & Son of Sacramento, Calif. The dam was started in April, 1947, and is scheduled for completion at the end of the 1950 season. The contractors have already made such excellent progress that com-pletion a year ahead of schedule now seems likely.

Vacuum Process Patented

The process in use at Dorena Dam is one on which all patent rights are held

SILENT Watchman HI-WAY TRAFFIC SIGN 0" high. Double



INDUSTRIAL PRODUCTS COMPANY

by Vacuum Concrete, Inc., of Philadel-phia. Originally invented to hasten the prefabrication of precast-concrete houses, the process has worked out very well in other fields. Reportedly, it was used to good advantage on Shasta Dam, and the results look good at Dorena.

The process is quite simple. It calls for a solid form panel, a rubber seal around the mat, and a suction mat made up of screen wire and 64 x 64-weave muslin cloth. The suction is then applied through a round hole in the form panel by means of a steel nipple and a rubber vacuum hose.

When the vacuum is applied, water in the fresh concrete quickly leaves, and some of the cement tends to move to the surface. The vacuum pulls all air bubbles out, also. The result is a fine,



Working from a steel trestle, this gas try-mounted Colby crane pours concret on the spillway section of Dorena Dam

dense surface which hardens rapidly. Experienced concrete finishers who pack the form bolt holes with neat cement say the concrete is much harder than regular concrete at the same age.

Process Used on Faces

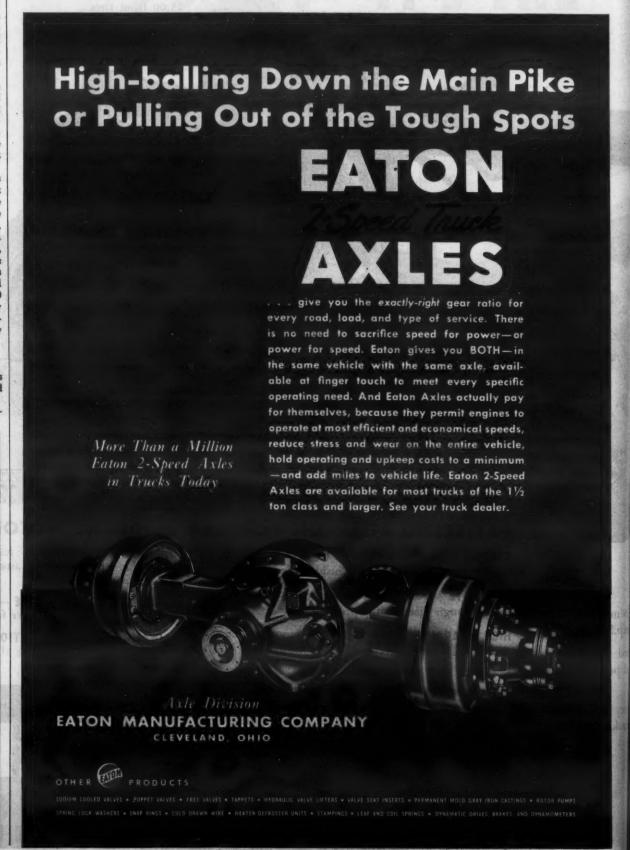
The vacuum method was specified for all concrete in the spillway section where water flowed. Concrete faces exposed to the rush of water include the five 5 x 6-foot outlet adits, the spillway ogee, and the lower part of the counterforted spillway training walls. The exposed slabs in the stilling basin at the toe of the spillway, along with the monolithic concrete baffle piers to deaden the rush of water, are also being treated with the proces

Out of a total of 160,000 cubic yards of concrete, approximately 20 per cent is being treated by the vacuum method.

Forming Methods Described

The forms which carry the vacuum device are all made of plywood facing nailed to 2 x 6 studs on 12 and 16-inch centers. The form panels are usually made up to pour 5-foot lifts in the spillway section, though considerable oddshaped forming was required also. The training-wall pours in the spillway are

(Continued on next page)







at left shows wall forming methods used in the vacuum concrete process m. Notice the dense concrete surface in the background. Above is a shot or a pour at the lower end of the stilling basin. Notice the white muslin in pla

also higher than this.

Each form is then divided into panels which are identified by rubber strips about 1½ inches wide and 1/16 inch thick. Inside these rubber strips are placed two layers of 16-mesh fly screen, stapled down. The rubber strips are stapled and glued to make a tight vacuum chamber. The screen is covered with a 64 x 64-weave muslin cloth stapled to the outside of the wood form. Into each panel a smooth 1-inch round hole is drilled, which will take a driven 1-inch nipple. The vacuum hose are later hooked on to each of these nipples as concrete fills one of the panels.

Specifications covered many sections where standard forms, which might be used over and over, were impossible. In some of the outlet adits where form work was individualistic and tricky, the cost of building the vacuum-suction material rose as high as 100 per cent over normal forming costs.

With the exception of some of thes

special forms, the rubber-strip-outlined panels each contained an area of from 8 to 10 square feet.

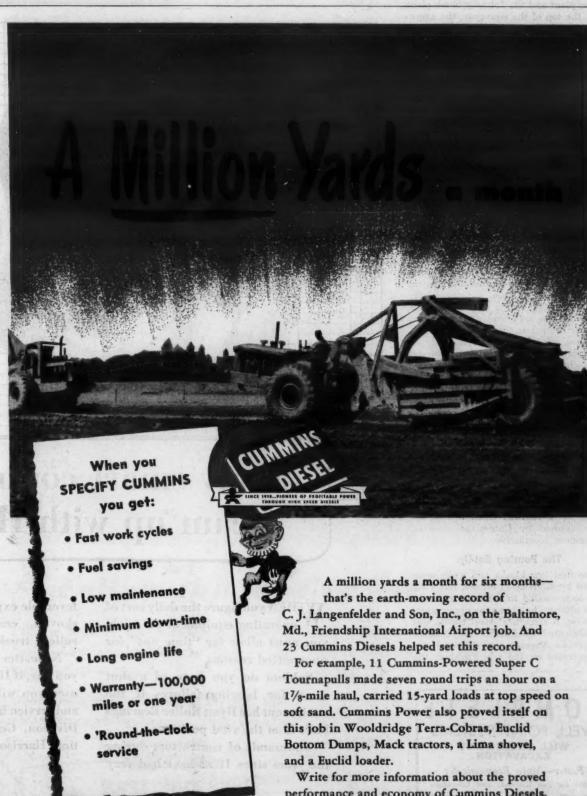
Standard suction pads were also made up to treat the surfaces of slabs where large areas were encountered. They were made on plywood, in the same manner as the other forms, but were portable, of course. On the stationary forms the muslin cloth could be used only once, but on the portable pads the cloth could be washed down with a water hose and the pad re-used several

Batch-Plant Set-Up

Concrete at Dorena Dam follows recent trends in reduction of cement content, with one harsh mix which contains only 282 pounds of cement per cubic yard. Sand and aggregates are produced on the job in sizes from No. 200 to 6-inch. Bulk cement is supplied by Oregon Portland Cement Co., and shipped to the 3,000-barrel Johnson bulk storage bin on the job. The batching plant is a fully automatic Johnson 5-compartment bin, with two Koehring 2-yard tilting concrete mixers on a lower deck.

Several concrete mixes are being handled, including the following:
(Continued on next page)





performance and economy of Cummins Diesels.

Concrete Hardened By Vacuum Process

(Continued from preceding page)

Ingredients	No. 1	No. 2	No. 3	No. 4
6-3-inch rock 3-1½-inch rock 1½-34-inch rock 34-No. 4 rock Sand Cement Air-entraining agent Water	lba. 935 850 458 427 876 282 2° 190	lbs. 810 785 540 365 740 376 4° 187	735 710 850 955 432 4.6°	1,425 765 995 517 5.5° 260
Total batch weight Slump os.	4,018	4,003	3,917 2-3	3,962

In these mixes, Number 1 is the ordinary 6-inch mass mix. Number 2 is a 6-inch base mix. Number 3 is a 3-inchmaximum mix used for finer work, and Number 4 is the 1½-inch-maximum mix used in wall pours. All weights given are for a 1-yard batch, and the Protex air-entraining agent gives an average of 4 per cent of entrained air.

The concrete-batching cycle starts

with the loading of the five graded sizes of aggregate onto the 375-foot x 30inch conveyor belt between the produc-tion plant and the Johnson batch plant. At the top of the conveyor, the aggregate is deposited according to size in each of the five top bins of the batch plant. From this point the automatic batching and mixing cycle starts with the loading of the various materials into

the weighing hoppers.

Controls for this and subsequent operations are fully automatic. A series of erations are fully automatic. A series of Mercoid switches, limit switches, slide valves, coil-operated solenoid valves, and air-ram-operated dump and charging gates are all controlled by a central panel board which limits each operation, making the plant self-operating except for routine maintenance and adjustment by the operator.

stment by the operator.

As material enters the weighing hop pers, it is weighed automatically. The charging gates close when the proper amount of material is deposited in each of the five aggregate hoppers. At this same point the cement is automatically weighed in a sixth hopper. The cement has a previously been unloaded and has previously been unloaded and transferred by means of a screw con-veyor and bucket elevator to the cement

hopper located on top of the plant. When a Koehring mixer is empty on the platform below, weighed material is discharged through a collecting cone to the particular mixer. At this point the water and Protex air-entraining agent, previously weighed automati-cally, are admitted to the mixer with the other material. Mixing time is 2 minutes, after which the mixed concrete drops to 4-yard concrete buckets made up specially for this job by the Gar-Bro Mfg. Co. of Los Angeles. Two of these 4-yard buckets, or three 2-yard buckets for topmost pours on the spill-way, are set on a flat car. Two such cars travel on a railroad track out to the pour, pushed by Caterpillar-powered Davenport locomotives.

The Pouring Set-Up

The first low blocks and walls were placed by land-based cranes, but a rig was soon needed to raise the concrete to its ultimate height as the upper pours went on. A structural-steel trestle was prefabricated by Pacific Iron & Steel Co. of Los Angeles, and the steel was field-erected on the job. Finished, the

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Faster-More Economically

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MACHINERY & EQUIPMENT CO., Inc.



On the Dorena Construction Co. contract at Dorena Dam in and an International TD-24 pull a 54-inch Euclid loader through bottom-dump Euclids are being filled.

trestle is 48 feet high from the base of the legs. Rails for a gantry crane were then laid, a railroad with switching spurs was installed for the Davenport comotives, and a wood deck and tim-

ber guardrails were also installed. On top of the steel gantry a Colby 200 shipyard crane was placed. This big

machine, equipped with a 115-foot steel lattice boom, was then able to reach high and wide.

Pouring Methods

Pouring methods are exactly the same for all concrete, except that vacuum-processed concrete is suction-treated as

the pour goes on. Also, the form work for the untreated concrete is faced with ordinary shiplap lumber instead of the

more costly plywood.

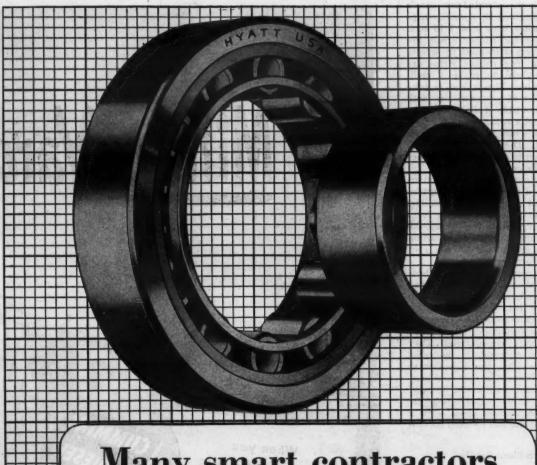
Pours are first thoroughly cleaned; leose dirt, scale, and any bits of wood left behind by the carpenters are removed. Reinforcing steel and embedded metal items are placed, then the forms are set up and tied to the previous pour with form belief and wife. with form bolts and nuts.

A light coating of cement grout is brushed in, but on the vacuum-pro essed pours the men have learned to keep the grout about 6 inches away from the face of the forms, owing to the tendency of the suction process to reduce grout seams to an unsightly chalklike substance.

Concrete is then placed in layers about 24 inches thick, and as the various form panels enclosed by the rubber strips are covered by the concrete, men

apply the suction treatment.

Equipment for this treatment consists of a Caterpillar-driven Gardner-Den-(Concluded on next page)



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HYATT ROLLER BEARINGS

ver 365-cfm air compressor on which two water-collection tanks are mounted, a steel pipe header, and a suction manifold on which a suction vacuum of 21 inches of mercury can be built up. The tanks, manifold, and nearly half a carload of 1-inch flexible rubber vacuum hose were rented from Vacuum Concrete, Inc.

Suction is held on a panel for from 10 to 15 minutes, in which time all free water is pulled from the concrete. Tests have been made to find out how much water is pulled out, and how much cement, if any, leaves the mix. Results are inconclusive, but they indicate that little cement leaves, and that the process will pull roughly 10 gallons of water from a 100-square-foot surface.

from a 100-square-foot surface.

Considerable difficulty was experienced in vibrating the 6-inch mixes. With so little cement present, a harsh mix was the result when the buckets were dumped, and it was found necessary to do a good deal of vibration on the dumped material with large Chicago-Pneumatic electric vibrators. When the two-man vibrators went to work on the material, it souped up to look the way concrete usually looks, and all the proper ingredients appeared.

and all the proper ingredients appeared.

However, this was hard on vibrators.
On some of the pours, three and four machines were carried away, still smoking, their motors burned up. Nothing would stand up until a CP service engineer came down, diagnosed the trouble as unusually tough concrete to handle, and doubled the size of the motors. This corrected the difficulty.

On the open slabs, the fresh concrete

On the open slabs, the fresh concrete is screeded and leveled off initially with wood floats. The portable suction mats are applied for 10 or 15 minutes and moved ahead. The concrete is then strong enough to support a man's weight, and is ready to be finished by steel trowels. Whiteman mechanical steel trowel finishers have been used on much of the spillway slab bottom, and in the stilling basin.

The concrete work will be finished far ahead of schedule. It would have been finished easily last season, but the Corps of Engineers directed that one spillway block be left low to protect the earth-fill part of the dam, also under construction. This will not prevent the dismantling of the trestle and gantry, because the low block can be poured later by a crawler crane working from the top of the completed section.

Dam Dimensions

Dorena Dam will rise to a maximum height of 145 feet above the stream floor, and will store flood run-off whenever the need arises. Its outlet works, closed by five hydraulic vertical gates which have been constructed and delivered by Willamette Iron & Steel Carp. of Portland, will pass 20,000 cfs when all gates are open. The spillway is designed to pass 97,000 cfs.

The dam will be one of several key structures to be built as authorized under Corps of Engineers supervision. The earth-fill portion of the dam calls for the use of a big fleet of rubber-tired

The earth-fill portion of the dam calls for the use of a big fleet of rubber-tired Tournapulls, Euclids and a Euclid loader, Peterbilt trucks with 35-yard Southwest hauling wagons from the Mills Field airport job, tractors, scrapers, and power shovels. It will involve about 4,000,000 cubic yards of borrow excavation.

Personnel

Corps of Engineers personnel are headed by Col. O. E. Walsh, Portland District Engineer. W. A. Schwarz is Resident Engineer, assisted by F. E. Drager. Kenneth Ramsey is concrete technician.

Dorena Construction Co. operations are being directed generally by A. H. Steiner, Project Manager, with Aubrey Horn as Project Engineer. Key superintendents are under the direction of R. J. "Slim" Conly, General Superintendent.

They include Bill Reeves on concrete, Jim Brown at the aggregate plant, and J. R. Wadle on the fill. Jack Murphy has charge of all drilling and shooting.

Hammers for Pile Driving

Single-acting pile-driving hammers are described in a bulletin issued by the McKiernan-Terry Corp., Dept. CD, 15 Park Row, New York 7, N. Y. The catalog describes the purposes and uses of these single-acting hammers, and lists their advantages. Revised specifications and a complete listing of component parts for all sizes of McKiernan-Terry hammers are featured.

Operating instructions also have been revised and elaborated on in the catalog. A formula is included which tells how to compute the bearing capacity of piles, with application to each of the five standard sizes of McKiernan-Terry single-acting hammers.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 39.

Rope-Splicing Aids

Two rigging aids to speed the splicing of wire or fiber rope are announced by Fellows & Stewart, Inc., Wilmington, Calif. They are a splicing vise to hold the rope while thimbles, sockets, and similar items are installed; and a hand fid to speed the threading of strands during splicing operations of any kind.

The splicing vise is designed to handle wire rope with diameters of from % to ½ inch, and is said to hold the rope firmly in place. It is adjustable and can be set in a stationary position or with a free swivel motion.

a free swivel motion.

The hand fid is used like a marline-spike except that a detachable hollow handle holds apart the strands which have been separated by the spike itself. The extra strand is then threaded through the hollow handle, after which the handle is removed, leaving the new strand in place.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 38.



This splicing vise announced by Fellows & Stewart, Inc., handles wire or fiber rope with diameters of 1/2 to 1/2 inch.

Hercules Ups Keplinger

John C. Keplinger has been promoted to Executive Vice President of the Hercules Motors Corp. He was formerly Vice President in Charge of



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How Proud Can We Be Of U. S. Highway Safety?

Figures on Nation's Traffic Deaths Encouraging, but Many States Lag: Much Still to Do About Highway Design and Uniform Traffic Control

+ HOW about the black line on the highway death chart? Which way is it moving, up or down? And what can be done to make it sag instead of soar? Members of the American Association of State Highway Officials heard the answers to these questions at their 34th annual convention in Salt Lake City this past September. Major General Philip B. Fleming, Administrator, Fed-

eral Works Agency, was the speaker.

Much has been accomplished, he said encouragingly. The widespread action generated by the President's Highway Safety Conference in 1946 helped to reduce the traffic death rate from 12 at the beginning of that year to 9.8 per 100,000,000 miles of travel at the year's end. The downward trend continued through 1947, until at the end of the year the death rate on the high-ways was 8.6 for each 100,000,000 vehicle-miles.

This decrease in highway fatalities was achieved in spite of motor-vehicle registrations which soared during 1947 to an all-time high of 37,883,000. Travel on the highways broke all previous records. Drivers' licenses were held by more than 44,000,000 persons. Nearly half of all individuals in the United States who were over 16 years old were driving automobiles. Yet the motorvehicle death toll in 1947 was reduced to 32,300. This represented a saving of 1,100 lives as compared with the 33,400 persons killed in motor-vehicle accidents in 1946. It also represented an enormous saving in property damage.
But what about 1948? Have mounting

traffic volumes brought an upsurge of death and mayhem on overcrowded highways? No, said General Fleming. The National Safety Council recently reported that the lowest traffic death rate in United States history, computed on the basis of mileage, was set on the nation's highways during the first half of 1948. Although 13,690 persons lost their lives during the six-month period, the death rate at the end of May had declined to 7.2. And recent estimates indicate that the rate for the second

half of 1948 dropped below 7.0.

We have not, however, accomplished enough to justify any degree of complacency, the General added. Saving human lives—even a single life—is cause for rejoicing. But the fight has not been won. Reduction of the traffic death rate below 7.0, encouraging though it may be, still means a staggering loss of lives and property.

Moreover, many states have fatality rates which are much higher than the

national figure.

It is significant that those states and munities which have been most faithful in carrying out the action pro-gram can boast of the lowest accident At the end of 1947, when the traffic death rate was 8.6 for the nation as a whole, a few states had reduced their rates to about half of the national average. Connecticut's traffic death rate was 4.3. Rhode Island's was 4.7. New Jersey's rate was 5. And the District of Columbia had the remarkably low rate of 3.2.

On the other hand, the traffic death rate in many states was considerably above the national average. Seven states had a rate of 11 and over: Arizona, New Mexico, Nevada, Tenne Georgia, Alabama, and South Carolina. The last two states topped the list, with a rate of 12.6 in Alabama and 12.4 in

South Carolina.

Apparently there is much still to be done, said General Fleming, and though state highway officials are interested primarily in highway design and construction, there are related fields of activity in which they can exert their influence effectively to promote high-

Uniform Traffic Controls

They can, for instance, cooperate with state and municipal authorities to encourage the adoption of traffic regulations that conform with the Uniform Vehicle Code and the Model Traffic

Lack of uniformity in traffic regulations caused little inconvenience 30 years ago and involved little danger.

Over the dirt and gravel roads of those days only the most courageous motorist ventured very far beyond the city limits where the pavement ended. Today's motorist, by contrast, may press through a dozen different towns and cities in several states in a single day. Diverse traffic regulations confuse him and frequently lead to accidents. Some com-munities he travels through have lights in the center of the street, some at the curb; some have them high, others have them low. The driver who must devote most of his attention to other cars around him has little time to peer about in an effort to locate the signals. Several major wrecks have resulted from this hodge-podge condition.

The same is true of the lack of uni-

formity in street and highway warning

and directional signs. There is no good reason why a road sign of uniform shape and size shouldn't mean the same thing in every state in the union. And certainly there is little excuse for a confusing diversity of signs throughout the towns and counties of a single state.

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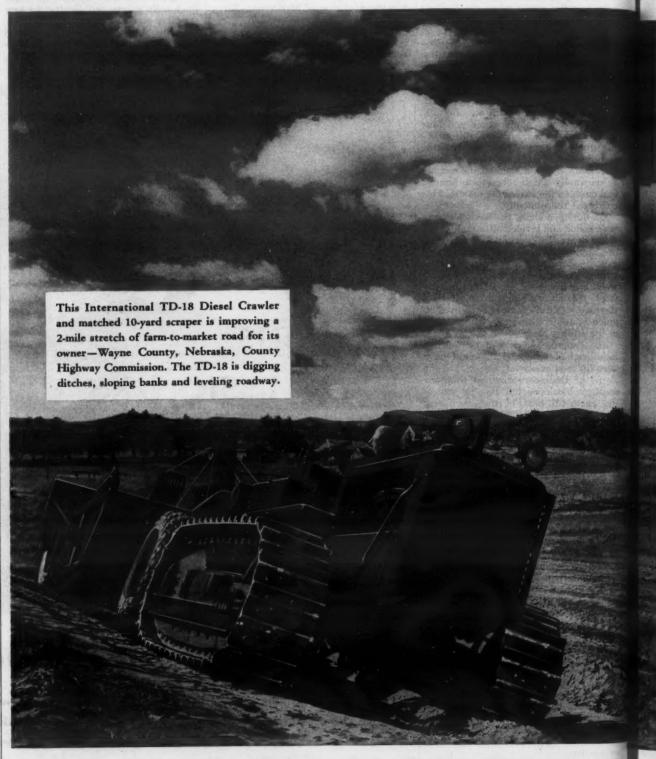
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The American Association of State Highway Officials has made an important contribution to the development of uniformity in traffic control devices, highway signs, and pavement markings, General Fleming went on. National standards for traffic control devices, directional signs, and markings, go back to 1925, when the AASHO began to lay out a uniformly marked system of interstate highways. From this work grew the familiar U.S. numbered high-

(Concluded on next page)



CRAWLER TRACTORS
POWER UNITS
DIESEL ENGINES
WHEEL TRACTORS

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way system, its well known shield marker, and various warning and directional signs. Today nearly all Federal-Aid primary roads have uniform signs and markings. In a few states, however, there is still a deplorable tendency to employ signs and pavement markings at variance from the national standards recommended by the Joint Committee on Uniform Traffic Control Devices. And the motorist is further confused by the wide divergence of signs and markings on state roads.

General Fleming reminded his audience that a new edition of the "Manual on Uniform Traffic Control Devices", prepared by the Joint Committee on Uniform Traffic Control Devices and published by the Public Roads Administration of the Federal Works Agency,

as just come from the presses. The Joint Committee includes representa-tives of the American Association of State Highway Officials, the Institute of Traffic Engineers, and the National Committee on Uniform Traffic Laws and Ordinances. Its members, he said, are outstanding traffic engineers of state and city highway departments, the Public Roads Administration, and numerous national organizations concerned with highway use and safety. Their recommendations should be accepted in every state as the best available guide to uniformity in the regulation of trafdirectional signs, and pavement markings.

Highway Design

"All of you", said General Fleming,

"are well versed in the principles of design that constitute the basis of highway safety, from an engineering standpoint. The fact remains, however, that most of our highways were designed with little reference to the element of safety. The exceptions are the comparatively few highways which were built to unusually high standards in recent

Engineers of 25 or 30 years ago built streets and roads to serve traffic needs at that time. Even if they had had the foresight to envision today's traffic vol-umes, it is doubtful that the roads would have been built any differently. The people who had to find the money to build them—township, county, and state officials, for the most part—were interested primarily in getting as much

mileage as possible for their money. It was necessary to stretch as far as pos-sible the meager funds available. Consequently, they were willing to sacri-fice width of pavement and refinements in construction to mileage.

Most of those earlier highways are now obsolete and will have to be rebuilt. They would have to be rebuilt regardless of the safety factor, merely to enable them to carry the heavy traffic of today at today's speeds. In the re-building, however, there is a priceless opportunity to bring them up to modern

safety requirements

Through careful field studies by the Public Roads Administration and state highway departments, real progress is being made in scientific determinations as to road width, lane capacity, sight distances, and other design factors that contribute to highway safety. These scientific findings are available to all highway designers and engineers. Moreover, practical experience has tes-tified that safer highways can be built. Remarkably few fatal accidents occur on roads built to modern standards. For example, Connecticut's Merritt For example, Connecticut's Merritt Parkway and Wilbur Cross Parkway, and the South Meadows Expressway in Hartford, are so constructed eliminate two-thirds or more of the fatal accidents that would occur if the vehicles were using an ordinary heavily traveled rural highway or city street. The Davison Expressway in Detroit has been in use more than five years, with only one fatal accident. The Arroyo Seco Parkway in Los Angeles has an accident fatality rate just one-ninth of the rate on adjacent arterial streets.

Let's Not Repeat Past Errors

"We know what should be done to build safety into our highways", said General Fleming. "The pertinent question is: To what extent are we doing it? In many instances, I'm afraid, highway departments are influenced too much by the . . . funds now available to them and in definite prospect. "Today's highway dollar will pay

for only half the amount of road work a dollar bought before the war. There is a temptation to spread road dollars thinly, in order to offset the high cost of materials, rising wages, and other unfavorable factors that have plagued highway officials and road builders since

the end of the war.
"We should, however, guard against a repetition of . . . errors made by earlier road planners who were forced to stretch the highway dollar too far. We should build not only for today's traffic needs but with an eye on the increasingly large volumes of traffic that undoubtedly will . . . use our main high-ways in coming years. Obviously, it is neither economical nor wise to build ... highways which ... only partly meet. present needs and, because of mounting: traffic volumes, . . . will have to be re-built long before they have deteriorated to a point where rebuilding normally would be necessary.
"There is no doubt that the people of

this country will be willing to pay for safe and adequate highways if the facts are laid before them in a businesslike way. California has taken the lead in going to the people with a statement of need and what it will cost, and the result has been gratifying. In at least 10 other states [there are] similar undertakings . . . and more are expected to follow

This is a critical period in the development of our highway transporta-tion system, and bold action is needed if we are to have a highway system that will give needed service with safety."

Goodrich Promotes Martin

Glenn E. Martin is named Manager of Sales Planning of the Replacement Tire Sales Division of The B. F. Goodrich Co. Mr. Martin has been with the com-



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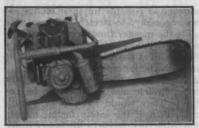
INTERNATIONAL HARVESTER COMPANY Chicago



Industrial Power







The new 1949 Timberhog chain saws, which feature two or one-man operation, are available in 20, 24, 30, and 36inch cutting capacities.

New-Model Chain Saws

Chain saws in 20, 24, 30, and 36-inch cutting capacities are announced in 1949 models by Reed-Prentice Corp., Dept. 48, 677 Cambridge St., Worcester 4, Mass. The Timberhog saws feature either one or two-man operation. They are powered by 4-hp gasoline engines.

The engines have a pressure-fed diaphragm carburetor designed to permit cutting at any angle through 360 degrees without the need for swiveling the blade or the carburetor. The Timberhog saws also feature light weight—the 20inch model complete with blade, chain, guide bar, and bumper plate, weighs 55 pounds.

Further information may be secured from the company or by using the enclosed Request Card. Circle No. 8.

Safe-Practice Bulletins

Safe practices for construction, for rigging, and for the operation of shop machines receive detailed treatment in three safety booklets issued by Industrial Indemnity Co., 155 Sansome St., San Francisco, Calif. Bulletin No. 80 discusses safe procedures in setting up scaffolds, ladders, platforms, stairways, and material towers; safe loads for timber planks, beams, and columns; and safety guards for power saws. It lists equipment safety orders for tractors, compressors, power shovels, cranes, and trucks; it describes shoring and bracing of trenches, safety precautions in using

electric tools, explosives standards, and wire-rope handling, care, and splicing. It also contains a section on personal safety equipment and first aid.

Bulletin No. 50 on rigging standards discusses safe loads for wire rope, wire-rope slings, and for manila rope. It contains information on seizing, splicing, and socketing of wire rope; engineering data about reels, drums, and sheaves; and rules and safety orders of good and bad rigging practices. Bulletin No. 90 on mechanical safeguarding standards discusses safe practices when using belt conveyors, power saws, shapers, and presses, and the proper types of guards to be used with each of these machines.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. For Bulletin 80, circle No. 4; for Bulletin 50, circle No. 5; and for Bulletin 90, circle No. 6.

Winch-Lifted Dump Trailer

A trailer designed to pull itself out of mud holes and mire when one set of

wheels is stuck is described in a bulletin released by Winch-Lift, Inc., 317 First National Bank Bldg., Shreveport, La. This winch-operated dump trailer is made in four standard sizes—6 to 8, 8 to 10, 10 to 12, and 20 cubic yards.

Features of the Winch-Lift dump truck which are described in detail in the catalog include large pay loads, low maintenance cost, engineered balance, the ability to walk itself out of bad spots, high maneuverability, and low initial cost. The bulletin lists complete dimensions for all four models and for the standard equipment which is provided with the Winch-Lift trailers.

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Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 2.





Built to Do a Better Job"

THE HUBER MAINTAINER

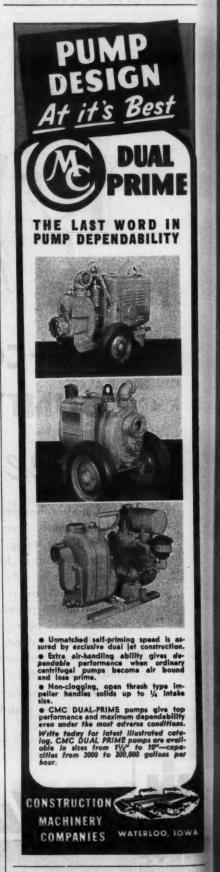
HUBER TANDEM ROLLERS

THE HUBER MFG. COMPANY Merion, Ohio, U.S.A.

Road men and contractors alike are setting their sights on the multimillion dollar construction program for 1949. To assure top profits throughout the year, and for years to come, smart operators are choosing Huber 3-wheel rollers for the tough compacting jobs ahead. They are known the world over for lower cost per mile performance... faster than average working... and longer life under all operating conditions. Modern in every respect the new Huber 3-wheel rollers are available in five models from 4 to 14 tons, gasoline or Diesel powered. Features include straight-line front end design ... welded super-strength frame... anti-friction bearings throughout... heavy duty drive line with 3-speed transmission, both forward and reverse.

This year rely on the Huber line—tandem rollers...3-wheel rollers...and maintainers to lick your compacting and maintenance problems. Write today for descriptive bulletins and name of your nearest dealer.





Turn to pages 106 and 107 for unusual Trading Post opportunities.

Tractors, Cable Clear Reservoir

Unusual Scheme Boosts Output of Cleared Land At Hungry Horse Dam as Old Tree Trunks Topple

+ TO solve a tough clearing problem, an unusual trick has been pulled at Hungry Horse Dam, near Coram, Mont. The versatile crawler tractor—this time in what is believed to be a new role is toppling trees at a speed unheard of there, although clearing has been under way for some time.

Two machines are clearing 10 acres an hour, and each acre has from 25 to 250 huge standing evergreen trunks about 125 feet high. This stunt rips them out by the roots as fast as the tractor can crawl through the woods.

The Redding, Calif., contracting firm of Wixson, Crowe & J. H. Trisdale has begun its \$1,370,000 contract for 7,034 acres in the Hungry Horse Dam reservoir area with what engineers of the U.S. Bureau of Reclamation say is the most effective scheme tried on this work to date. The scheme involves two D8 Caterpillars, with a 400-foot piece of 2-inch cable hooked to each of their drawbars, which walk through the woods in a way even Paul Bunyan never dreamed possible.

Problem Is Tricky

The clearing problem throughout this part of the huge reservoir is one of the most dangerous men have ever tackled. In 1923, a bad forest fire swept through the Flathead National Forest, burning much of the virgin timber in the reservoir area. Great trees up to 150 feet tall were killed, the fire destroying their foliage. But the tall trunks, some 3 feet in diameter at the butt, remained behind like ghosts.

The trunks and limbs stand thick and treacherous today, with second-growth evergreens about 35 feet high between them. How to cut down these thousands on thousands of dead trees has been one of the worst clearing problems at Hungry Horse. The best of power saws are too slow for the magnitude of the job, and the timber stand is too thick to try any hand method and make any profit at the contract price of \$250 per acre.

A bulldozer would push the trees over, but operators would be killed daily by the dry limbs or "widow makers" sure to crack off and fall. That scheme was out from the start.

"Red" Wixson, J. H. Trisdale, and General Superintendent W. C. Fields are all old hands at clearing. They cleared the Shasta Reservoir and several jobs since. What would happen, they wondered, if two tractors dragged a long loop of cable through the woods? Would the trees topple down, or would the cable break?

Scheme Tried Out

To make sure the cable would not be likely to break, they purchased the best (Concluded on next page)







General Superintendent W. C. Fields (left) inspects a swivaled "jewel" or rope socket in the cable which two Caterpillar D6's are pulling through the Hungry Horse Dam reservoir area to clear it. Above, a welder makes an on-the-job repair to one of the swivels on the 400-foot piece of 2-inch cable.



PORTABILITY AND CAPACITY... these are the fundamentals you KNOW you want in a truck shovel. You get PORTABILITY in a "QUICK-WAY" because it is built of steel for lightness and strength, no heavy counter-weights to slow you down. You get CAPACITY because balance and stability are designed into your "QUICK-WAY".

In addition you get SPEED... PERFORMANCE...
VERSATILITY... INTERCHANGEABILITY... SIMPLICITY... ECONOMY OF OPERATION... LOW
FIRST COST... LOW MAINTENANCE... and EXTRA
PROFITS.

A "QUICK-WAY" mounts on ANY standard truck of proper size to go anywhere a truck can go at truck speed. A "QUICK-WAY" is CONVERTIBLE IN MINUTES from SHOVEL to CRANE, DRAGLINE, CLAM-SHELL, PILE DRIVER, SCOOP, TRENCH-HOE or BACK FILLER. You buy only the attachments you want. A "QUICK-WAY" is simply built, with many interchange-

able parts, all easy to service . . . and durable.

THE FUNDAMENTALS built into every QUICK-WAY" add up to sure profits on a small investment, with one of the most useful machines you can own.

NO MATTER WHAT OTHER EQUIPMENT YOU OWN, you need "QUICK-WAYS" too. There's a "QUICK-WAY" owner near you; ask HIM.

Service available from Distributors strategically located throughout U.S. Others werldwide



MODEL E: 4/10 cu. yd. cap. for mounting on any standard 5 ton fruck.

MODEL 1- 1/4 cu. yd. cap. for mounting

For speed, portability, economy of operation, and adaptability to a wider range of jobs, nothing of comparable size equals a "Quick-Way" Truck Shovel.

"QUICK-WAY" TRUCK SHOVEL CO.

Tractors and Cable Clear Reservoir Area

(Continued from preceding page)

grade of 6 x 19 lang-lay preformed wire rope with a wire-rope center. Then just in case something should go wrong, the rope was divided into eight 50-foot lengths. At each end of each length a swiveled "jewel", or rope socket, was fastened, to permit each length of cable to roll and squirm on the ground without stranding. Should one of these sections break, a spare can be slipped

in without very much expense.

A 12-foot cable sling, also of the same
2-inch diameter as the main rope, is fastened to the drawbar of each tractor, and attached to the jeweled swivel on

the ends of the rope.

According to "Whitey" Fields, his two operators are not afraid of anything. When the rig was assembled, George Nelson on one machine and William Birdwell on the other talked it over. For their protection, they had previously rigged heavy steel roofs, welded on heavy pipe uprights, over the tractor seats. As a further safety sure, they decided to leave a belly in the cable sufficiently deep to permit both machines to be in the clear as the trees fell.

Finally everything for the first test was ready. The big D8's, both in low gear, started through the woods. The bight of the heavy cable came to the butt of a 3-foot patriarch of the woods, a giant pine tree. The cable stretched tight, the tractors belched black smoke from their exhaust pipes on the pull, and the big tree cracked like a rifle as it swayed and fell. Nelson and Bird-well grinned at each other as the top crashed to the ground about 80 feet be-

hind the tractors.

But the trees are far too close together to be given individual attention. Often there will be three and four big ones in the cable at once. The thicker the stand of trees, the narrower the swath the machines make. Excellent teamwork between the two operators is a "must", because the work is tricky, and the ground is a sloping mountain-

The scheme was not long in offering another happy surprise. For many of the smaller live evergreens, which the men believed would have to be grubbed out by blades later, are coming out with the cable. Later on, it is planned to bring in two of the powerful new Model A Tournadozers to grub and pile trees and brush preparatory to burning. Later on in the 800-day contract there will be 30 tractors with 60 operators, and all points of the operation will then be detailed in a subsequent article.

The two tractors, working from 50 to 75 feet apart as they crawl through the woods, are making new clearing records every day. The two machines cleared 500 acres in 4 days, working a 12-hour shift per day. The down brush on this acreage will, of course, have to be piled and burned.

Both tractors are also equipped with Caterpillar bulldozer blades, so they can drop the cable if need be and rough in a road for footing. Cutting edges from Wooldridge Terra-Clipper scrapers have also been riveted to the bulldozer blades to the bulldozer blades to the statement of the company to the compa dozer blades to give them a keen knife edge for skimming off light brush with-out rooting up the dirt.

Wild-Life Kibitzers

The operation is not altogether without its lighter side. The Hungry Horse reservoir area is in a virgin timber-land, and the country is wild. The cable which drags along through under-brush, windfalls and sweeps everything Three industrious and out before it. very businesslike coyotes usually watch the work from a safe distance and mark the flight of grouse, disturbed when the cable flushes them out of their hiding



C. & E. M. Photo

General Superintendent W. C. Pields (left) of Wixson, Crowe & J. H. Trisdale, discusses clearing at Hungry Horse Dam with USBR Safety Engineer H. S. Latham.

On one of the earlier clearing proj- | blade. After looking the machine over, ects, a huge bull moose walked up to a D7 Caterpillar tractor with a bulldozer

the moose lowered his head against the blade and pushed. Nothing happened.

The moose backed up a few steps and gave a little run. Still the tractor did not budge, but the operator, eating his lunch a short distance away, watched in amazement

The big bull moose backed off about 35 feet, snorted, and pawed the ground. With an earth-shattering bellow he charged the machine at a gallop. His 6-foot antlers hit the blade with a solid smash, stunning the mean old animal. After a few minutes he struggled to his feet, shook his head, and trotted off among the pine and larch trees, satisfied that this ungainly yellow interloper would take no nonsense.

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P. Garner Joins Alexander

Paul Garner has purchased an interest in the Alexander Mfg. Corp. of Picayune, Miss. The company manufactures a line of disk harrows and other equipment for use in roadside development and soil-stabilizing work. Mr. Garner has been named Vice President and General Sales Manager.



WATERLOO FOUNDRY CO., WATERLOO, IOWA



For Perfect Traffic Lines:

AIR CURTAINS, basic feature of all Kelly-Creswell Equipment, make possible the application of clean-cut, attractive lines without coming in contact with the

Special striping guns by DeVilbiss, air-actuated traction and pressure-cleaning equipment also feature K-C equipment. These are the reasons why more Highway Zone-marking material is applied through K-C equipment than through any other make.

TRUCK-MOUNTED AND PORTABLE EQUIPMENT AVAILABLE There is a Kelly-Creswell Model that will solve your zone-marking problems.

KELLY-CRESWELL CO.,

Xenia, Ohio

Present Day Practice in Belt Fastening

Every man who has anything to do with the purchase, application or maintenance of conveyor, transmission or V-belts will find the bulletins listed below of considerable value in connection with belt fastening work. A knowledge of present day practice in belt fastening helps reduce the loss in machine hours due to belt failures caused by the use of the wrong type of fastener or improper application. We shall be glad to send any or all of them to you or to any of the men in your organization. your organization.



FLEXCO HD Belt Festeners are used to make a "water-tight" butt joint in conveyor belts ranging from ¼" to 1½" thick and of any width. The view on the right shows the various types of rips that can be repaired with these fasteners and Flexos HD Rip Plates.

lletin F-100 gives complete w to fasten and repair com



ALLIGATOR V-Belt Fusteners are now being widely used to fasten B, C and D, openend V-belting of cross woven fabric core construction now being made by most belting manufacturers. The view at the left shows a typical application of these fasteners to a drive where endless V-belts would require dismantling the machinery to put the belts on the sheaves.

Bulletin V-205 gives complete instructions on how to use V-belt fasteners.

FLEX V Fasteners for A and B belts are also available for lighter duty V-belt drives. Ask for Bulletin V-14.



ALLIGATOR Steel Belt Lucing is in world-wide use to make smooth, flexible joints in leather, rubber, balata, stitched canvas or solid woven belts up to 36" thick and si wide as they come.

Bulletin A-60 tells how to fasten and repair transmission belts. Sold by Supply Houses Everywhere

FLEXIBLE STEEL LACING COMPANY 4608 Lexington Street, Chicago 44, III.

Convention Calendar

Feb. 23-25-American Concrete Institute

Annual convention, American Concrete Institute, Hotel Statler, New York City, N. Y. Harvey Whipple, Secretary-Treasurer, American Concrete Institute, New Center Bldg., Detroit 2. Mich.

Feb. 28-March 2—Utah Highway Conference Annual meeting, Highway Engineering Conference, Union Bidg., University of Utah, Salt Lake City, Utah. Prof. A. Diefendorf, Head of the Civil Engineering Department, University of Utah.

Feb. 28-March 3-AGC Convention

Annual convention, Associated General Contractors of America, Inc., Waldorf-Astoria Hotel, New York, N. Y. H. E. Foreman, Managing Director, Munsey Bldg., Washing-ton 4, D. C.

Feb. 28-March 4-ASTM Meeting

Spring meeting and Committee Week, American Society for Testing Materials, Edgewater Beach Hotel, Chicago, Ill. C. L. Warwick, Executive Secretary, 1916 Race St., Philadelphia 3, Pa.

March 1-3—No. Atlantic Highway Officials
Annual convention, Association of Highway
Officials of North Atlantic States, Hotel Statler, Boston, Mass. A. Lee Grover, Secretary,
State Highway Department, Trenton, N. J.

March 3-4—Kentucky Road Conference
Kentucky Road Conference, University of
Kentucky, Lexington, Ky. D. V. Terrell,
Dean, College of Engineering, University of
Kentucky.

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March 10-12—Mississippi Valley Meeting
Annual meeting, Mississippi Valley Conference of State Highway Departments, Edgewater Beach Hotel, Chicago, III. C. E. Vogelgesang, Chief Engineer, Indiana State Highway Department, Indianapolis, Ind., Conference Secretary.

March 23-26—Roadside Development
Eighth Annual Short Course on Roadside
Development, Auditorium of Ohio Department of State Bidg., 65 S. Front St., Columbus, Ohio. Dallas D. Dupre, Jr., Landscape
Architect, Department of Highways, Columbus 15, Ohio.

April 11-14—Purdue Road School
Annual Road School, Memorial Union
Bldg., Purdue University, Lafayette, Ind., and
Road show in Purdue Armory. Ben H.
Petty, Professor of Highway Engineering,
School of Civil Engineering and Engineering
Mechanics, Purdue University.

April 11-14—Corrosion Engineers Meeting
Annual convention, National Association of
Corrosion Engineers, Netherland Plaza Hotel,
Cincinnati, Ohio. A. B. Campbell, Executive
Secretary, 905 Southern Standard Bldg.,
Houston 2, Texas.

MARTIN

April 20-23—ASCE Meeting
Spring meeting, American Society of Civil
Engineers, Biltmore Hotel, Oklahoma City,
Okla. Col. William N. Carey, Executive Secretary, 33 W. 39th St., New York 18, N.Y.

Products for Road Joints

Products for expansion and contraction joints are described in a catalog issued by the Keystone Asphalt Products Co., Division of American-Marietta Co., 43 E. Ohio St., Chicago 11, Ill. These products include the Keystone longitudinal and transverse tongue-and-

groove joints of asphalt-mastic board, dummy joints of asphalt-mastic board, fiber expansion joints, premolded asphalt expansion joints, sealing compounds for expansion joints, Kapco No. 336 joint-sealing compound, concrete-curing compounds, and sewer-joint

compounds.

The catalog shows cross-sectional views of the two types of road joints— rectangular tongue-and-groove and dummy contraction joints. Also an accompanying chart rates the efficiency of each of the joints when used with tie bars of various size and spacing. Drawing, text, and on-the-job photo-graphs explain how to install these

Keystone products.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 1.







This "VAI" tractor is equipped with scarifier, scraper, and loader—a com-

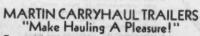
You can pretty well forget spades, shovels and scythes when you have a Case "VAI" tractor with equipment such as shown here. Compact and nimble-footed the "VAI" works swiftly in spots too snug for ponderous machinery. Low in cost, such an outfit . . . both tractor and its mounted equipment . . . bring the economy of complete mechanization to smaller jobs and smaller operators. It makes clean work so easy that there's little hand finishing left.

Like the larger Case tractors, the "VAI" has a heavy-duty, Casebuilt engine. The way it pulls stronger when slowed down is an advantage in picking up heavy loads and getting around in close quarters. It saves a lot of clutching and gear shifting. It is a main reason for Case ENDURANCE—the ability to run long hours without faltering, long years with little maintenance.

Case industrial tractors are built in four basic sizes, from 2500 to more than 10,000 pounds. All have extra strength, stamina and stability for sustained performance under mounted equipment.



TRAILERS



Ease of loading, dependability and economical operation are three Martin CARRY-HAUL Trailer characteristics which make them the leaders in the field.

Regardless of your hauling job, there's a proper size Martin CARRYHAUL Trailer to do it for you safely and economically.

RICE PUMP & TAKCHINE

Advertise your used equipment

"Trading Post"

See pages 106 and 107

Send your ad to:

Contractors & **Engineers Monthly** 470 Fourth Ave., New York 16, N.Y.

Your "CATERPILLAR" Dealer is your MARTIN Dealer. See him for your trailer

COMPARY

Dredge Pumps Fill For Building Levee

Hydraulic Material Is Placed Between Retaining Dikes; Protection Along Intracoastal Waterway

NEW levees are under construction along the north bank of the Intracoastal Waterway west of Morgan City in St. Mary's Parish in southern Louisiana. South of the Intracoastal Waterway in this region the land is low and marshy, and subject to recurrent floods. Periodic high waters have little effect, however, on the economy of this strip of sparsely inhabited land which stretches out to the Gulf of Mexico. It is a land of fishermen, hunters, and trappers, whose live-lihood is not unduly disturbed when the east-west Waterway goes beyond its hanke

But north of the canal is the Teche ountry, through which Bayou Teche follows a sluggish course, roughly parallel to the Waterway, before empty-ing into the Atchafalaya River above Morgan City. Along the Teche the land is higher, and is one of the most productive farming sections of all the fertile areas of southern Louisiana. Furthermore, U. S. 90, major east-west Federal highway reaching from Jack-sonville, Fla, to Van Horn, Texas, is located along the right bank of Bayou Teche. Thus if the Waterway to the south ever got out of bounds in times south ever got out of bounds in times of high water, serious damage would result to this opulent lower Teche region, and the only east-west highway south of Baton Rouge would also stand in danger of being severed. The same holds true of the main-line track of the Southern Pacific Railroad which also lies north of the Intracoastal Waterway.

Protection Levees

Accordingly, the Corps of Engineers, Department of the Army, New Orleans District, has awarded contracts for levee protection along the north bank of the Intracoastal Waterway from the Atchafalaya River west to the high ground at Bayou Sale ridge. The only gap in this nearly 14-mile-long earth embankment will be at Wax Lake Outlet where Grand Lake has a connection to the Gulf of Mexico. The left or east bank of this Wax Lake Outlet will provide a protection levee which will complete the encirclement of the lower reach of Bayou Teche; this work is now in progress. A levee already exists along the south shore of Grand Lake, and on down the Atchafalaya to the Berwick lock at the mouth of the Teche. Below the lock another levee and a concrete floodwall through the town of Berwick will complete the ring back to the new levee construction.

Thus when all the items of this major flood-control project are completed, the large, roughly rectangular area containing the lower portion of Bayou Teche, and sections of U. S. 90 and the Southern Pacific railroad will be rimmed with man-made flood-protec-tion structures. The big area will be virtually an island surrounded by the waters of Grand Lake on the north, the Atchafalaya River on the east, Intracoastal Waterway on the south, and Wax Lake Outlet on the west.

Future work will also include a levee along the right or west bank of the Wax Lake Outlet from Grand Lake to the Intracoastal Waterway. Flood-gate structures will likewise be built in Bayou Teche on both sides of the Out-

Levee Contracts

The first levee contract along the north bank of the Intracoastal Waterway running west from the Atchafalaya River was awarded by the Corps of Engineers to Jahncke Service, Inc., of New Orleans, La., for a low bid of \$317,500. It involved the placing of 1,000,000 cubic yards of hydraulic fill in a levee from 6 to 10 feet high and 9,599 feet long. Of this length 3,349 feet extended along the lower Atchafalaya River to the confluence of the Intracoastal Waterway. The remaining 6,250 feet is a continuation westward along the canal or Waterway. This contract is known as the Charenton-Intracoastal Canal Levee, Item W-96-L, Lot B. Work on this new first-lift levee got under way the last day of January, 1948, and was scheduled for completion at the end of the year. The completion date was contingent upon the contractor's being able to proceed with the work

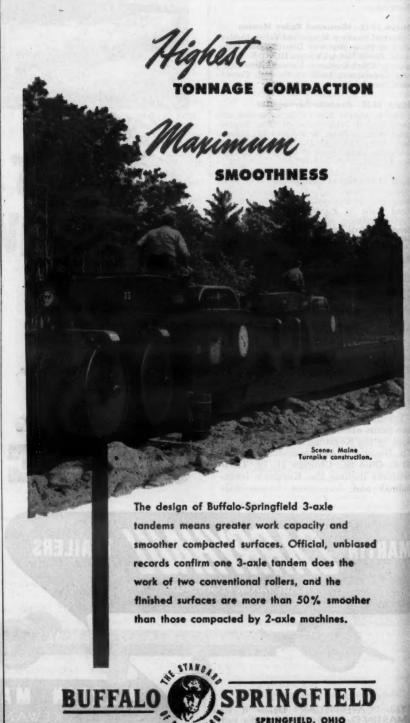


C. & E. M. Photo ernberg Dredging Co.'s subcontract to Jahncke Service, Inc., a Northwest crane with a 1%-yard drag bucket shapes up a retaining dike.

without being interrupted by floods.

Jahncke Service, Inc., sublet the building of the retaining dikes, between which the levee embankment is con-structed, to the Sternberg Dredging Co. of St. Louis, Mo. The retaining dikes

were thrown up by two crane rigs, one with a clamshell working from a barge, and the other, a 60-foot-boom Northwest, operating on land from timber mats. The latter was equipped with a (Continued on next page)



SPRINGFIELD SPRINGFIELD, OHIO



1%-yard drag bucket. Nearer the waterway the ground was firmer and slightly higher than farther back. (This is common to all watercourses subject to flooding, and is caused by the deposition of material as the waters recede.) Hence the dragline could be used on the construction of the so-called riverside dike, while the floating unit was required for the land-side dike construction. The material excavated for the flotation channel was used for the land-side dike.

Adjoining this first contract is a sim-Adjoining this first contract is a similar project, designated Item W-121 Wax Lake East Levee, and including approximately 4,075,000 cubic yards of hydraulic fill. This job continues west along the Waterway, 44,717 feet, to Wax Lake Outlet. This section was awarded to McWilliams Dredging Co. of New Orleans, La., on its low bid of \$1,362,273. Work started in February, 1948, and is expected to be finished early in 1949. The levee will have a gross height of from 6 to 10 feet. The hydraulic dredging operations of this contract will be described in detail.

The remaining 23,093 linear feet of levee from Wax Lake Outlet west to Bayou Sale Ridge is known as Item WLW Wax Lake West Levee, and was awarded to Jahncke Service, Inc., of New Orleans for \$540,600. This included the placing of 1,720,000 cubic yards. The 1,575,000 cubic yards of hydraulic fill for building the levee to a gross height of from 7 to 18 feet. The westerly 7,490 feet remaining called for the placement of 145,000 cubic yards of uncompacted fill in a levee with a gross height of from 7 to 11½ feet. This Type 3 fill was cast in place by a dragline. The con-tractor started operations on this section in February, 1948, and finished in December.

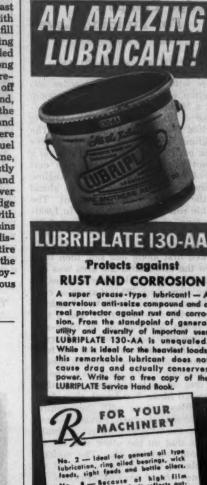
All three of these levee contracts fall in the general category of West Atcha-falaya Basin Protection Levees, New Orleans District.

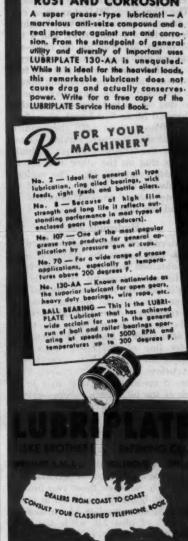
McWilliams Contract

The McWilliams Dredging Co. con-

tract, Item W-121 Wax Lake East is the largest of the three, with 4,075,000 cubic yards of hydraulic fill along a levee 8 miles long. Preparing the foundation for the levee included clearing some 350 acres of land along the Waterway, but no grubbing was re quired. Trees and stumps were cut off about 1 foot above the natural ground, and were then burned along with the other debris of brush, vines, and branches. Clearing operations were handled by a subcontractor, Emmanuel Bean Construction Co. of Plaquemine, La. A crew of 45, made up mostly of Cajuns, did the work both by hand and with the help of two Mall power saws. The higher ground along the edge of the Intracoastal was infested with rattlesnakes, while water moccasins abounded in the swamps a short dis-tance back from the water. The entire area was thick with alligators. But the Cajuns, hunters and trappers from boyhood, were indifferent to the dangerous reptiles surrounding them.

(Continued on next page)





Protects against



The NEW General Motors

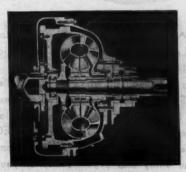
DIESEL ENGINE-TORQUE CONVERTER UNIT

HERE is a complete, integrated Diesel engine-torque converter unit that combines the inherent efficiency of the GM 2-cycle Diesel engine with the features and advantages of both torque converter and fluid coupling. It provides torque multiplication up to 4 to 1 for starting variable heavy loads. It also provides highly efficient transmission of power during light load periods by automatically shifting to fluid coupling in the upper speed range.

A smooth, uninterrupted flow of power, delivered through a liquid, prevents engine stalling under any load and protects both engine and driven machinery from sudden shocks.

One Manufacturer—One Responsibility

Up to now most engines and hydraulic drives have been separate units. The result-compromise designs and divided responsibility. Now General Motors



In the new GM Torque Converter, oil does the work. Automatic transition from torque multiplication of 4:1 at stall to 1:1

cifically designed and manufactured as an integral part of the General Motors Series 71 Diesel engine. It is a self-contained unit built by one manufacturer providing a long needed saving in space and weight as well as certain desirable operating characteristics not available before.

offers a new torque converter spe-

This new power unit will get the most work done in the least time because the engine operates in its most efficient speed range at all times-delivering maximum engine horsepower regardless of the speed of the load. Maximum torque to

start heavy loads PLUS maximum horsepower to keep the load moving.

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Dredge Pumps Fill For Building Levee

(Continued from preceding page)

With clearing out of the way, the prime contractor then built retaining dikes with a Link-Belt Speeder 595 dragline, equipped with a 70-foot boom and a Hendrix LS 3-yard bucket. Because of the soft ground the big rig worked from double timber mats. The dragline was provided with twelve mats, each 30 feet long x 4 feet wide x 1 foot thick. Working from the east end of the job to the west, the dragline always kept 5,000 to 6,000 feet ahead of the hydraulic-fill placement. The double row of dikes was built in 1,000-foot-long sections for the first 3,000 feet of construction, then in 3,000,foot sections after that. The dragline worked first along one side then back down the other until the area was encircled by the shallow earth dikes.

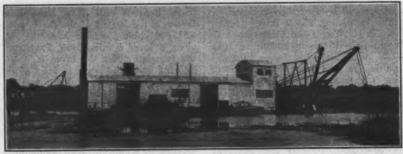
The dikes were 300 feet apart on cen ter lines, and were built to a height of 6 feet with a 4-foot crown and 4 to 1 side slopes. Material for the river-side retaining dike was taken from a borrow pit which was at least 80 feet out from the center line of the retaining dike in the direction of the Waterway. The pit was dug on a 1 to 1 slope to a depth of minus 6.0 Mean Sea Level, then down on a 10 to 1 slope until the required material was obtained, leaving a 1 to 1 slope on the far side of the pit. A similar pit was dug on the other side for the land-side retaining dike. The material was placed with a single cast of the dragline which worked between the pit and the dike.

Hydraulic Fill

Material for the transverse dikes which tied across the retaining dikes was obtained from borrow pits within the hydraulic-base-fill area. The hydraulic base fill that was pumped into the sections formed by the retaining and transverse dikes was taken from a land-side borrow pit, with the top of the near slope at least 400 feet from the center line of the levee. This slope dropped off on a 1 to 1 to a depth of 20 feet below the natural ground. From there it continued on a 10 to 1 to the back of the pit, where it rose again on a 1 to 1 slope to ground level. The back of the pit was kept at least 20 feet off the right-of-way line.

From the pit the material was pumped in between the retaining dikes— first in a line along the river-side dike; then along the dike on the opposite side; and finally between these two lines of deposit to bring the levee up to grade. The natural ground is at an average elevation of plus 2.0, while the gross grade of the levee is plus 10.0. The average height of the levee is around 8 feet at the center. While the slopes are flat, they have sufficient pitch on their angle of repose to drain to a 4-foot fill at the retaining dikes. A minimum average end area of 1,400 square feet is required for every 10 consecutive stations. To allow for minor inaccura-cies in placing the fill, a tolerance of plus or minus 2 feet is allowed in the height of the fill.

The average depth to which the borpits were excavated was around 20 feet. In order to insure proper drainage of these pits, the specifications required that the pit be continuous, with a minimum bottom width of 60 feet and



C. & E. M. Photo
The Shirley No. 1 dredge placed hydraulic fill for the McWilliams leves contract along

depth to minus 10.0 MSL elevation. Between the retaining dikes the soft marsh land was 8 to 10 feet deep. As the heavy clay from the borrow pits was pumped in on top, the soft marsh was rolled ahead until it was forced over the transverse dike at the end of a section.

Shirley No. 1

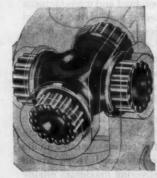
The hydraulic fill was placed by the

McWilliams dredge, Shirley No. 1, which was built in 1939 by the Green-ville Sand & Gravel Co. of Greenville, Ohio. The dredging company acquired it three years ago. It has an all-steel hull 96 feet 6 inches long x 46 feet wide x 5 feet deep, of ¼-inch plates increased to 5/16 inch at the stern. It has a single deck except at the bow, where the control room for the leverman or operator is on the second deck. The housing is

At the bow is a 50-foot ladder weighing 40 tons supported by a 26-foot A frame with two sets of cables, one 11/4 inches and the other 11/2 inches in diameter. The A-frame is guyed back to a 12-foot-high gantry just forward of the deck house. Off to each side, near the base of the A-frame, is a 45-foot anchor boom fashioned from steel tubing taken from the boom of a cargo ship. The booms are 11 inches in diameter at the center and 9 inches in diameter at the ends, and are guyed back to a 22-foot-high framework. The anchor booms carry 350 feet of %-inch cable connected to 3,600 and 4,800pound anchors. The dredge can thus swing on its anchor line, or on the regular haul or swing line which also has 350 feet of 34-inch cable hooked to deadmen on shore. The deadmen are used when the dredge is working close to firm and accessible adjoining shores. The anchors are needed when the cut is wide, or if the ground near-by can-

(Continued on next page)





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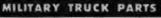
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not be employed for burying deadmen. The latter was usually the case on this

At the end of the ladder is a 56-inch 5-vane right-hand basket-type cutter head driven at 30 rpm through a reduction gear by a Westinghouse 115-hp electric motor. The maximum depth at which the ladder and cutter head worked on this job was 32 feet. In the soft muck and clay, the hard surfacing on the cutter head required only infrequent renewals. The ladder sup ported the 19-inch suction line which was connected directly down the center line of the dredge with the Amsco 16-inch suction pump. The pump has a 42inch 3-vane impeller and 14-inch runner. Overhead is a monorail with a Hercules 11/2-ton hoist for lifting the lid off a manhole in the intake line just forward of the pump. Thus debris can be removed before it reaches the pump. The 16-inch discharge line leaves the pump on the port side, passes through a stop valve which prevents water from backing into the pump should the discharge line break, and then runs down the port side of the dredge to the stern.

Dredge Operations

Inside the deck housing at the forward end of the dredge is a Mundy 7drum hoist; this was originally a 5-drum hoist but the two additional drums were added for the anchor lines. They are arranged in a 4-2-1 layout, with the two anchor drums on the outside of the front bank on each side of the swing drums. The next two are for the port spud and ladder, while the single drum to the rear and center is for the starboard spud. Behind the last drum is the bull gear and a Westinghouse 50-hp electric motor to drive it.

Directly behind the pump is the dredge prime mover, an Enterprise 655hp 8-cylinder 4-cycle diesel engine with 12-inch bore and a 15-inch stroke. It drives the pump directly through a flexible coupling at 509 rpm. Over this engine there is also a monorail equipped with another Hercules 1½-ton hoist for handling repairs or service. The main engine is started by compressed air, the compressor being driven by a 15-hp electric motor. Slightly to the starboard side is a Waukesha 215-hp 6cylinder 4-cycle semi-diesel auxiliary

WOOLERY "AJX" WEED BURNER

engine which, at 900 rpm, drives a Westinghouse 125-kva generator. The latter runs the hauling-gear motor and two G-E motors—a 40-hp and a 75-hp which are located near the stern of the The last two motors operate two Goulds 4-inch and 5-inch pumps to provide water for the circulating cooling system.

Auxiliary engine No. 2 is a Buda 180-hp 6-cylinder 4-cycle diesel engine which at 900 rpm drives a G-E 187-kva generator. This unit is located aft of the main engine; it supplies power for the cutter-head motor and also furnishes the lighting for the dredge.

Outside the hull at the stern are the two 45-foot spuds set in wells on 7foot centers. Each spud weighs 31/2 tons and consists of a hollow steel pipe covered with 1/4-inch steel plates to form a 23-inch square cross section. The port spud is down when the dredge is digging.

Up in the control house overlooking

bow of the dredge is the leverman who controls all movements of the



C. & E. M. Ph No. 1 is this Amsec

edge. Here also are the various gages which indicate how the dredge is oper-

ating. The average vacuum is 10 to 12 inches, while the discharge is around 70 pounds. Gages on the switchboard show the amperage and voltage of the cutter-head motor.

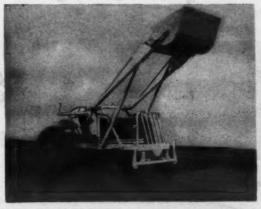
Discharge Line

The average length of the 16-inch discharge line was 1,200 feet—400 feet of floating pipe and 800 feet of shore pipe. The pontoon line was in 40 or 50-foot lengths and was connected to the pipe on the dredge at the port stern corner by means of three Mobile Pulley ball joints. The same type of joints con nected the floating lengths of pipe. Each length was supported on two steel cylinders, 20 feet long x 4 feet in di-ameter, placed 20 feet apart. The pipe fitted into metal saddles on top of the pontoons which were tied together in pairs with either timber strongbacks or steel I-beams. On shore the pipe came in 10, 16, and 20-foot lengths with tapered ends. Because of the great width of the

(Concluded on next page)



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Dredge Pumps Fill For Building Levee

(Continued from preceding page)

area being filled in—300 feet between center lines of retaining dikes—three or four wye connections were taken off the discharge line to spread the hydraulic material out fairly evenly. No baffle boards were used at the end of the pipe, as the heavy clay dropped solidly to the ground as soon as it left the line. As much as 30 per cent of solids was pumped through the line when the dredge was working in the soft clay.

dredge was working in the soft clay.

Working 24 hours a day, the Shirley
No. 1 averaged 8,000 cubic yards of fill
over the three shifts. The average consumption of diesel oil per day was 800
gallons; the tanks on the dredge held
3,000 gallons, or a trifle under four days'
supply. A crew of 45 was engaged in
the dredging operations, with about 22
working on the dredge and the remaining 23 on the shore line. The Shirley
No. 1 had no accommodations for the
crew members, so they lived on a twodeck quarter boat which was anchored
in the borrow pit near the dredge. The
shore crew got back and forth to the
dredge either in small boats or on the
catwalk which was built over the
pontoon line. It consisted of two 2 x
10's with a 2x4 guardrail along one
side.

In lieu of a derrick boat to handle the pipe and other heavy equipment, a Northwest crane with a 55-foot boom was set up on a 26 x 100 x 5-foot-deep steel barge. Necessary welding was done with a Hobart 300-amp electric welder mounted on a small pontoon barge. Towing was handled by two tow boats: the L. J. Walet, a 65-foot craft powered by two Mack 100-hp marine diesel engines; and the El Diablo, a 45-footer driven by a Caterpillar 100-hp diesel engine.

hp diesel engine.

Other floating equipment included a 26 x 100-foot water barge which transported fresh water to the job from Morgan City; and a 65 x 20 x 5-foot-deep steel barge for diesel fuel, having a capacity of 750 barrels. The oil barge was towed to the site after being filled at the Standard Oil Co. of Louisiana refinery at Baton Rouge, La.

Personnel

The only item in the contract was the 4,075,000 cubic yards of hydraulic base fill. Personnel for the McWilliams Dredging Co. included O. M. Gautreau, Superintendent; David B. Limerick, Engineer and Paymaster; with Archie Cole, Captain, and G. E. Causey, Chief Engineer, of the Shirley No. 1.

Engineer, of the Shirley No. 1.

For the Corps of Engineers the project is supervised by the Morgan City Field Office which is headed by Henry K. Lee, Field Assistant. W. D. Stockman looks after dredging and levee operations in this subdivision. Col. John R. Hardin is District Engineer of the New Orleans District.

Magnet Frees Roads Of Extraneous Metals

Magnets for removing nails and other foreign metal from roads, runways, and traveled surfaces in general are manufactured by The Ohio Electric Mfg. Co., 5900 Maurice Ave., Cleveland 4, Ohio. The Ohio magnets are made in round or rectangular shapes, with the latter especially recommended by the company for road-cleaning work. They are suspended from a truck about 3 or 4 inches above the road surface, and are generally used in sets of two or more so their fields will overlap and form a wide, continuous magnetic path.

The Ohio magnets are energized by a gasoline-driven generator mounted on the truck chassis. They feature heat-resistant bottom construction, doubly protected terminals, an oversize chain support to protect them from dropping,

and ample insulation to prevent electric shocks to the user. Among their construction features designed to direct the magnetic lines to where they will be most efficient are these: proper proportion of copper and steel, proper size of poles, proper space between alternate poles, and proper winding.

Further information may be secured

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 50.

Thew Shovel Promotions

A. W. Wagner is the new General Parts Division Manager of The Thew Shovel Co. Temporarily, he will also continue his duties as Manager of Parts Division Sales. Assisting him is Cyril Brecknock, who has been named Manager of Parts Division Manufacturing in charge of Thew Plant No. 5. N. W. Anderson has been named Manager of Parts Division Operations, and Don Lewis has been appointed Manager of Parts Division Publications and Catalog Design.

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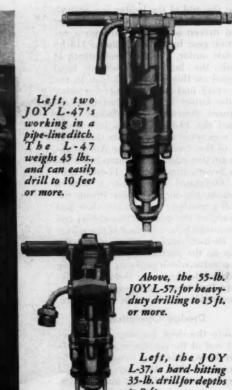


or <u>Remove</u> Nuts, Bolts, Cap Screws

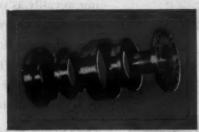
This great, new Van Dorn Impact Wrench is sure to save you time and money on assembling and disassembling jobs! Powerful and sturdy—delivers 2000 rotary impact blows a minute. No uncomfortable jarring or twisting—no "fighting" the Wrench to get results. Easy to remove fasteners, even the stubborn "frozen" ones. Motor cannot be stalled—even if spindle is stopped "dead"—so there's no danger of overload or "burn-out." Weighs only 8½ lbs. Full ½" capacity. Aak your nearby Van Dorn Distributor for details. Write for free catalog to: The Van Dorn Electric Tool Co., 787 Joppa Road, Towson 4, Maryland.

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GENERAL OFFICES: HENRY W. OLIVER BUILDING . PITTSBURGH 22, PA.

New Wing Is Added To Big Power Plant

(Continued from page 3)

they were discharged. The concrete was vibrated as it was placed. On the job were three cranes—a Northwest, Lorain, and a P & H, all with 60-foot booms which served to dig foundations, handle steel reinforcing, charge the batch plant, or lift the concrete buckets to the forms.

Wooden Forms

Side-wall forms for the concrete pours were well built of 34-inch fiveply plywood, backed with 4 x 4 studs on 16-inch centers. Double 2 x 6 wales were placed on 30-inch centers. Through the walls went Universal tie rods on 30-inch centers both ways. The average size of wall panels was 4 x 8 feet, and the walls were usually poured in heights of 6 to 12 feet at a time. Most of the form lumber was cut out on a CMC table saw which was set up in the lumber form yard.

Steel Erection

The 1,800 tons of structural steel for the new wing was supplied by the American Bridge Co. plant at Gary, Ind., but was erected by the contractor. Steel erection started on April 10, 1948, and was completed by September: Two rigs were employed. The lower mem-bers were handled by a Northwest crane with a 110-foot boom. The higher steel was erected by a stiffleg derrick with a 125-foot mast and a 115-foot boom. The derrick moved upward on the structure until it reached a point 115 feet above the ground—the highest level from which it worked, although it set steel 45 feet higher than that.

Holding the derrick were six 1-inch cables as guys. Two of these, 240 feet long, extended out to the ground. The other four guys were shorter and were tied to the building. The derrick was operated by a Flory three-drum steam hoist powered by a vertical coal-burning boiler. The top drum handled the boom, the center drum took the main load, while the third or lower drum was used as an auxiliary. A single American drum off on the side rotated the derrick in its 360-degree swing; it also was powered by the boiler.
Probably the heaviest steel member

that the derrick lifted was a 22-ton built-up girder, 50 feet long and 8 feet deep, that supports the boiler drum. It also set a 15-ton truss and the heavy main columns of the building. Some of these columns weighed 45 tons, but they were divided into four sections for

ease in handling.
Riveting was done by three gangs of four men each. Compressed air for the riveting guns was furnished by a Schramm 315-cfm compressor which pumped air to a vertical cylindrical receiving tank. The air was drawn off from there as needed by the three riveting crews. In general, %-inch rivets were used in the structure. But in some of the heavier members, 1-inch size was required; and in the 22-ton girder, special rivets 1\% x 7 inches were driven.

Upper Walls of Brick

Above the level of the turbine room



es of G. I. Truck Parts Wilensky Auto Parts Company 1226 No. Wash. Ave. • Minneapolis, Minn.

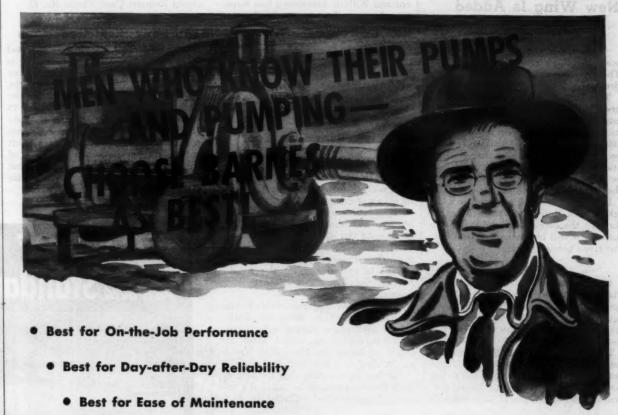


American Gas & Electric Service Corp. Photo
The batch plant which Sollitt Construction Co. set up for its power-plant extension job included a Blaw-Knox coment bin and a Blaw-Knox 2-compartment aggregate bin.
Two CMC 28-S units mixed the concrete.

the walls are red brick, varying in thickness from 17 down to 13 inches. Approximately 1,000,000 bricks were needed in the new addition. They were supplied by the Belden Brick Co. The bricklayers worked from Patent

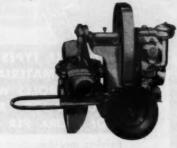
scaffolding, a substantially built work platform 9 feet wide and stretching out for 175 feet along the building. The floor was of 2 x 10-inch planks, 16 feet floor was of 2 x 10-inch planks, 16 feet long, supported by steel cross members on 7-foot centers. These steel cross members were hung from the 16-inch steel roof purlin beams by ½-inch cables front and back. The purlins are on 7-foot centers also, but as they do not overhang the sides of the building, two 8-inch I-beams were cantilevered out from the purlins. These levered out from the purlins. These I-beams, each 15 feet long, were placed one on top of the other, and clamped together and to the purlins with 1-inch U-bolts. The steel cables from which the scaffolding was hung were attached to the cantilevered I-beams.

Bricks and mortar were raised to the (Concluded on next page)



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Americas Gas & Electric Service Corp. Photo
This view looking south at elevation 730 of the new power-plant extension shows floor
decking in place at elevations 730, 748, and 780.

New Wing Is Added To Big Power Plant

(Continued from preceding page)

scaffolding on a 200-foot hoisting tower. This was operated by a Clyde two-drum hoist powered by a Buda engine.

Two large cranes are installed in the present turbine room. The smaller crane, of 20-ton capacity, will handle miscellaneous parts, while the larger 100-ton crane will be used for lifting sections of the turbine itself. Both cranes will move on rails which will be extended out into the addition from the older portion of the power plant. Like the rest of the plant, river water

Like the rest of the plant, river water taken from above the dam will be run through the condensers under the new turbine. It will be discharged back into the river below the dam.

Personnel

When the addition to the Twin Branch Plant is completed, the Indiana & Michigan Electric Co. will be still better equipped to meet the increasing demands for light and power in the two states that it serves.

The construction at Mishawaka is being personally supervised by George Sutherland, Vice President of the Sollitt Construction Co. of South Bend, Ind. Ernest Rans was General Superintend ent and Willard Armstrong was Superintendent on the erection of the steel. From 150 to 200 men are employed on the project.

The project is being carried out under direction of H. A. Kammer, Chief of the Design and Construction Division of American Gas & Electric Service Corp., with headquarters in New York City.

Block-Handling Tool

A carrying handle for use with concrete blocks is manufactured by The Block-Lift Co. of Mt. Vernon, Ohio. Designed to simplify and speed the handling of concrete blocks, the tool is equipped with a vise-like jaw which is placed over the outside web of the block. As the handle is lifted, the jaw grabs the web and holds it tightly through a lever action as long as the weight is maintained on the handle. Setting the block down immediately frees the handle.

According to the manufacturer, the handle can also be used for sliding blocks into place during actual construction operations. And after the block is placed, the Block-Lift handle can be used as a tool to true it up.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 88.

New Aerating Device Keeps Bin Flow Steady

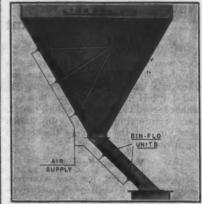
An aerating device to provide uniform and steady flow of bulk material from bins, hoppers, and chutes is announced by the Bin-Dicator Co., Dept. F-605, 14615 E. Jefferson Ave., Detroit 15, Mich. The Bin-Flo unit is designed so that it can be located at points where the flow of material is likely to be restricted. In operation, a low-pressure stream of air is injected into the material through a special fabric diffuser, causing the material to flow freely.

The Bin-Flo unit is a small plate measuring 3% x 7½ inches x ½ inch thick. Models are provided for use in thin-walled bins and chutes, or for concrete or other thick-walled hoppers. Piping can be run either outside of thin-walled bins or inside thick-walled containers. According to the manufacturer, the Bin-Flo units will not piug up even when used with finely ground material.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 13.

Portable Steel Conveyors

A 4-page folder on a line of all-steel self-powered conveying elevators is being distributed by the Sam Mulkey Co., 1621 Locust, Kansas City 8, Mo. Folder MC-300 lists 12 features of the Mulkey conveying elevators and 13 specifications, covering type of construction, standard lengths and heights to which the various conveyors will lift materials, type of mounting and size of tires, standard widths, weights, type and capacity of power units, type and ratio of gears and reductions possible, etc.



The Bin-Flo aerating device is designed to provide a uniform flow of bulk material from hoppers, bins, and chutes.

Photographs show the basic units and extensions and how they can be combined to produce long conveyors. They show the conveyors in use raising sand, bricks, mortar, lumber, roofing materials, boxes, dirt, sacked materials, etc. And they also illustrate three special features claimed for the Mulkey elevators—easy maneuverability during towing, improved winch assembly for raising the unit into position, and balanced undercarriage.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 52.

"Cat" Agent in the South

Dale S. Gronsdahl is the new District Representative in Alabama, western Florida, and central Tennessee, for the Caterpillar Tractor Co. He succeeds L. L. Morgan, who recently joined the company's Advertising Department.





Standard Steel Works on

Cement-Treated Base Laid Under New Road

Low-Cement-Content Mix Is Produced by Pugmill In Central Plant; Laid To 6-Inch Thickness

A BASE stabilized with 4 per cent of portland cement is one of the princi-pal features of a highway link recently ed for the California Division of Highways in and adjacent to the city of Ontario. The new 5.6-mile job, at a contract cost of \$873,000, was done by the Highway Division of Morrison-Knudsen Co., Inc., through its Los Angeles District Office.

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The project lies on U.S. 60, about 40 miles east of Los Angeles. Improve-ment of the new section makes Highway 60 a four-lane divided thoroughfare from Pomona to Riverside, and augments past improvements from Los Angeles east to Riverside. The job is a part of the overall traffic-improvement program in southern California, and will help this road to carry more vehicles than it could previously.

The base for the new highway is a 6-inch-thick cement-treated course of select crushed material, laid 25 feet wide in two strips. Adnun Black Top Pavers were widened to 12 and 13 feet to lay this width. A 3-inch thickness of plant-mixed bituminous surfacing covers the base, and extends 36 inches beyond its outer limit to make a 28-foot roadway. Backslopes were graded to a general average of 5 per cent for good drainage. Where the new highway intersects cross streets through the city of Ontario, the base and surface courses were flared wider to allow vehicles to make an easy turn.

Grading Work

The job began October 24, 1947, when Morrison-Knudsen moved in with excavating equipment. The borrow area selected by the contractor was located in a field not far from the job. One of the requirements of the owner and San Bernardino County ordinance which influenced the selection of machines was a provision which called for a uniform 24 inches to be taken off the borrow pit. Fills on the roadway were also generally shallow, varying from 6 to 36 inches. It was not often possible to line out on a long strip and operate at

peak capacity.

A Euclid loader, drawn by a Cater-pillar D8 tractor, was selected to load the material. Six bottom-dump Euclids took the dirt from the loader and hauled it to the fill. The loader neatly stripped 24 inches out of the borrow area by making two 12-inch passes over the entire area.

Material was a silty sand. It dug easily, but had the disadvantage of being quite dusty when dry. Water-tank trucks sprinkled the material, however, when it was dumped, and the earth was mixed further by a Caterpillar motor grader which leveled the material. It

was then compacted to 95 per cent density by two sheepsfoot-roller units. The embankment was then bluetopped and dressed to neat lines by Caterpillar motor graders, and was ready for the placement of the stabi-

lized base course. Much of the finished embankment lay through the winter of 1947-48, waiting for the mixing plant

to be set up.

Central Mixing Plant

The borrow area where crushed material was produced for base and surface courses was situated in an alluvial wash about ¼ mile above Foothill Boulevard, and 5 miles north of the job. The excavated area, from which 53,000 tons of base material and 35,000 tons of

plant-mix aggregates were dug, was shaped to make a flood-control catch basin above Foothill Boulevard, which is heavily traveled by interstate highway U.S. 66.

The plant was so set up that crushed rock was delivered to the base-course pugmill plant, and also to the hot-mix plant, in two piles. By regulating the of sand and coarse rock to either plant through tunnel gates or clamshell loading, the contractor could easily batch the required mixes. Crushing equipment was all new

A 21/2-cubic-yard Northwest shovel, working in the pit, loaded three enddump Euclids to start the material on its way to the crushing plant. The pit contained quite a high percentage of oversize boulders large enough to cause

trouble at the primary crusher. This problem was solved effectively by erecting scalping grizzlies of railroad rail over each Euclid. A heavy rail was laid on top of the right-hand side of each truck bed, and spot-welded. Up-right pieces were welded to this mem-ber, and capped by another piece of channel iron. The grizzly rails, spaced at 15-inch centers, were then laid on top of the framework. When the Northwest shovel dumped a dipper of material on this framework, only the minus-15-inch material could fall through The rejected stones were pushed aside quite easily by a Caterpillar bulldozer.

The loaded Euclids traveled only

about 600 feet from the pit to the primary feeder. This reciprocating feeder unit was a new Telsmith, driven by an electric motor. The bank-run material (Continued on next page and page 75)

Henke Rotary Power Sweeper Write for details.

Designed for sweeping bituminous roads before retreatment, and removing excess screenings from base courses prior to surfacing. Also used in street sweeping and snow removal. 7 and 10 ft. sweepers available with patented full circle swing and 56 in. tread. 10 ft. sweeper consists of two 5 ft. oscillating cores.

HENKE MFG. CORP., Janesville, Iowa





"IT'S REALLY BUILT-

Any time you put a shovel on a truck you need a chassis that's designed for the job. And MICHIGAN knows how—they've built their own chassis for years.

clutches give you the extra yards a day you're after.



"IT'S EASY TO HANDLE-

You know that if a machine is rough on the operator he'll probably be rough on the ma-chine. MICHIGAN'S air ram clutches are fast and easy. They take the work out of operating. That's why my operators like to run the MICHIGAN."



See MICHIGAN Truck Shovels at work on jobs like yours — write for Bulletin 100, "On The Job with MICHIGAN."



MICHIGAN POWER SHOVEL COMPANY, 490 Second Street, Benton Harbor, Michigan, U. S. A.

Cement-Treated Base Laid Under New Road

(Continued from preceding page)



A Morthwest shovel loads a Euclid with pit rock to be crushed for a new comentstabilized base course on U.S. 60 at Ontario, Calif. A grizzly device over the Euclid bed screens out oversize rock so that only minus-15-inch material can fall through.



About 600 feet from the pit, the Euclid dumps the bank-run material to a Telsmith feeder. A 30-inch x 56-foot conveyor carries it to the Telsmith primary crushing and sizing unit at the left in the photo.



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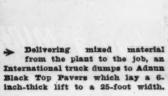
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Next step is a Telsmith Size
48 Gyrasphere crusher and secondary screening unit. In the background is the central pugmill mixing plant which Morrison-Kundsen
Co., Inc., set up for its 5.6-mile
\$873,000 contract.

A Lima clamshell feeds the crushed material to a Bodinson 40-ton two-compartment bin above the Madsen pugmill. The silo at left in the picture stores the cement which is added to each batch.



Morrison-Knudsen's new 6,000pound Madsen pugmill which
mixes the cement-stabilized basecourse material is driven by a Cummins diesel engine. Mixing time is
45 seconds per batch.



(C. & E. M. Photos)





♦ A 14-ton Buffalo-Springfield roller working behind the pavers develops about 97 per cent of optimum density in two passes.



Finally, emulsified asphalt applied by pressure from a Littleford portable spray pot cures the cement-stabilized base and primes it for the asphaltic plant-mix surfacing which will be laid down in two 1½-inch lifts to complete the job.

was fed to a 30-inch x 56-foot conveyor, which carried it to the first crushing and screening unit.

On this first unit, the material dropped down to a double-deck, 4 x 8-foot set of Telsmith screens. Material rejected from the top 4-inch-mesh scalping deck passed through an 18 x 32-inch Telsmith primary crusher powered by a Caterpillar D8800 diesel engine. Fines passed through the 2-inch mesh on the bottom screen deck, and dropped to the conveyor leading away from this unit.

A 35-foot-long 30-inch conveyor took the outgoing material from this unit to a feeder hopper, located just ahead of the part crushing unit

the next crushing unit.

From this feeder hopper, material passed over a 60-foot conveyor to the final crushing and sizing unit. This unit consisted of a set of triple-deck Telsmith screens, and a Size 48 Telsmith Gyrasphere crusher. The triple-deck screens consisted of a 2-inch-mesh scalping unit, a 1-inch screen which passed fines, and a 5/16-inch screen which passed sand. Oversize material was by-passed back to the Gyrasphere crusher. Material from 5/16 to No. 200 went into the sand pile, and from 1¼ to 5/16 was stacked in the coarse-rock pile. Two 24-inch x 60-foot conveyors stacked the material over tunnels which fed the hot-mix plant. The crushed material could also be picked up from these piles and fed to the pugmill plant by the Lima 2-yard clamshell machine which fed the base-course plant.

Electric power for all conveyor and

Electric power for all conveyor and feeder motors was generated on the job by a Caterpillar D13000 diesel-electric unit. The generating unit was located centrally, to be accessible in short leads through the whole plant.

The hot-mix plant consisted of a Standard Steel Works 3,000-pound batch mill, with steam boiler, asphalt and fuel-storage tanks, and Standard bins and weigh hoppers. The 3-inch plant-mix surfacing was batched from this plant.

Mixing the Base Course

The cement-stabilized base course was proportioned and mixed at the central plant. It consisted of a Bodinson 40-ton two-compartment bin, weigh hopper, and a new 6,000-pound Madsen pugmill mixer. This pugmill was driven by a Cummins diesel engine through a flat-belt drive.

Specifications for the batch called for the following weights of material:

Sand	2,400 lbs.
Rock	3,600 lbs.
Water	360 lbs.
Cement	240 lbs.

Specifications for crushed material called for the following sizes in the batch, and sizes were controlled by the amount of sand:

Size Screen	Per	Cent	Passin
11/2-inch		90	100
No. 4	35		0-80 5-60
No. 30		10	0-30

The various materials were weighed progressively in a batch hopper, and as they were dumped to the pugmill the water for each batch flowed directly to the pugmill. The mixing time for each batch was 45 seconds. Eight International trucks hauled material from the mixing plant to the job, and each truck carried four of the 6,000-pound batches per trip.

Mixing water came from a near-by well. Portland cement was trucked in by bulk carriers from the Riverside Cement Co., about 35 miles east of the job. Considering the tonnage of material which had been run when the job was visited, abrasion had not been severe either on the crushers, the screens, or the paddles on the Madsen pugmill.

Laying the Base Course

spray

Mixed batches, dumped to the International trucks, were weighed on platform scales before leaving the plant,



C. & E. M. Photo
A Gaterpillar No. 12 motor grader spreads base-course material at street intersections
on U. S. 60 at Ontario. Calif.

and each driver received a ticket which he transferred to the foreman on the highway. As the trucks left the scale, each driver unrolled a canvas cover over the top of the material to prevent its drying out. The cement-treated material was end-dumped to two Adnun Black Top Pavers, each working not more than 200 feet apart and usually only two loads apart. These machines laid the material out in a uniform 6-inch-thick lift

as they rolled ahead.

Compaction was done by a 14-ton Buffalo-Springfield smooth three-axle tandem roller, working close behind the Adnun machines. Concrete curbs along the dividing esplanade, which had previously been built, furnished a handy reference as to elevation of the base-course material.

The heavy smooth roller developed about 97 per cent of optimum density in two rolls, which was highly satisfactory. However, it left small checks in the surface of the base, which had to be removed. The rubber tires of a truck were used for this purpose. A water tank mounted on this truck furnished a light spray over the base surface as the truck rolled back and forth, and kept the material alive until the pneumatic tires finished their work.

From 0.15 to 0.20 gallon per square yard of emulsified asphalt was then applied by pressure from a Littleford portable spray pot. This seal not only cured the cement-stabilized base, but

(Concluded on next page)



Cement-Treated Base Laid Under New Road

(Continued from preceding page)

also served as a priming aid for asphaltic plant-mix to follow.

Where street intersections occurred, the base-course material had to be applied in variable widths beyond the 25-foot limits of the roadway. The material was simply end-dumped by the hauling trucks at these points, and spread to the required thickness and surface smoothness by a Caterpillar No. 12 motor grader. These sections were also compacted by the Buffalo-Springfield roller.

The hot-mix surfacing was laid down in two 1½-inch compacted lifts by Barber-Greene Tamping-Leveling Finishers, which completed the job. The new road was scheduled to be open to traffic between September 15 and October 1, 1948.

Personnel

The job was designed and generally supervised under the direction of Charles H. Purcell, Director of Public Works, at Sacramento, with George T. McCoy as State Highway Engineer. E. Q. Sullivan at San Bernardino was District Engineer in charge of the contract, with E. A. Bannister as Resident Engineer.

For Morrison-Knudsen Co., Inc., Martin Greene is General Superintendent for Southern California, and H. B. Shannon was the Job Superintendent in direct charge of the project. Jack McGuire was in charge of the mixing-plant set-up; Charles M. Harold was Crusher Foreman; and Art Towler and Al Zaretzka were Foremen. Jim Cannon was the Project Engineer, and Mark Osterhout was Office Manager.

Surveying Crews Use Two-Way Hand Radios

Surveying crews equipped with twoway radios are now at work in Adams County, Ill. They are employed by an electrical cooperative in the county, and several advantages are expected to result from their use of the radio equipment. It is felt that the handie talkie units will permit the rod to be aligned even though the rodman cannot be seen by the instrument man; that the radio equipment will permit



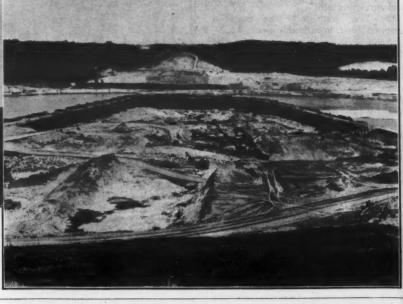
A new TD-24 diesel tractor (above) owned by Hardaway Contracting Co. of Columbus, Ga., tackles its first job—leveling earth trucked up to a spoil and stockpile area from the excavation for Clark Kill Dam on the Savannah Biver in Georgia. The photo at right shows the completed cofferdam and first-stage excavation which the Hardaway company is handling.

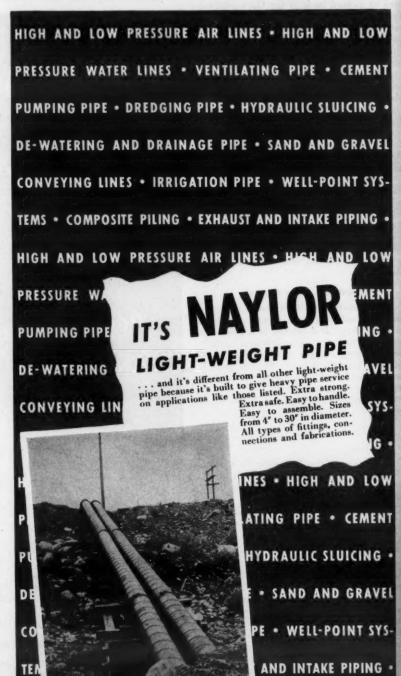
the crew to stake from one-third to one-half more miles of line from one setting of the instrument than is possible with hand or voice signals.

The units in use by the Adams Electrical Cooperative were furnished by Motorola, Inc., 4545 W. Augusta Blvd., Chicago 51, Ill. They weigh 7 pounds each and are carried by means of shoulder straps. The earphones and microphone are contained in a single cradle-type set similar to a modern telephone, which permits free use of the hands except during conversations.

The portable hand sets operate on 37.62 megacycles—the frequency used by the other two-way radio equipment owned by the Adams Electrical. The range of the hand units is from 2 to 3 miles; of the Adams truck radios, from 5 to 6 miles; and of the home-office transmitter, 10 miles. Permission has been requested from the Federal Communications Commission to carry one of the portable units, tuned to the same frequency, by airplane. Three employees and the manager of Adams Electrical are licensed pilots, and planes are used by the group to direct crews to damaged areas which are observed from the air.

Further information on these portable radio units and their use may be secured from the company. Or use the enclosed Request Card. Circle No. 44.







Dropped, slammed and battered on the job, blocks and sheaves have to be tough! Compare AMERICAN "armored construction" . . . see why these blocks and sheaves serve better, last longer. Many types, all sizes, from 1½ to 250 tons, for wire rope only. Sold by distributors everywhere. Made by AMERICAN HOIST AND DERRICK Co., St. Paul 1, Minn.

ALSO MAKERS OF THE AMERICAN HANDIWINCH AND GENUINE CROSBY CLIPS D

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NAYLOR PIPE COMPANY

1270 East 92nd Street, Chicago 19, Illinois

A Grooving Machine For Concrete Joints

The hand methods and pickaxes now employed for cutting out joints in concrete-pavement maintenance may soon become obsolete. The new Tennant concrete-grooving machine now in production is designed to eliminate slow, back-breaking, costly, joint-cleaning methods which have been in effect ever since the first concrete-paving joint needed resealing. The machine is designed and built to clean out old seal and debris, and to cut new edges in concrete joints. It thus prepares expansion and contraction joints, cracks, and irregular fissures for resealing, making a deep clean cut so that a strong per-manent bond can be formed with the new seal. In this way the chances of water seepage are minimized, and more lasting protection is given to the pavement, the manufacturer reports.

The new machine is made to handle as simply as a power lawn mower which it somewhat resembles. It runs on two small rubber-tired wheels and has handles at the rear adjustable to the convenience of the operator. It weighs about 700 pounds and can be moved from job to job in a light truck, or even towed. A 13½-hp air-cooled gasoline engine powers the unit through a V-belt drive. The forward rotation of the cutter head pulls the machine, providing rapid self-propelling action. The unit has a heavy steel frame and an oversize shaft-and-bearing assembly, yet it is compact and balanced for operation.

It cuts out the joints with a series of case-hardened steel cutters mounted on a cutter head which rotates at about 2,200 rpm. This cutter head may be fitted to cut any width of joint up to 2¼ inches. The width, depth, and

profile of the cut are readily controlled. Spare cutter heads are supplied with every unit, and are easily changed for replacement, the manufacturer says. A dust screen on the unit helps to keep out abrasive concrete dust and dirt,

and allows only clean air to enter the cooling fins of the engine.

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The machine handles irregular fissures as easily as a straight joint. It removes the old, hardened, dried-out seal or sticky bituminous material from joints under repair, and leaves the walls rough and clean with no bituminous ear. Once the joint is cleaned, the remaining steps in the resealing operations are handled in the usual manner.



Loose material is swept or blown out with compressed air, and the sealing

material is poured into the joints.

The Tennant concrete-grooving machine has already been used to remove old seal from the Shirley Highway pavement south of Washington, D. C., and in other road maintenance work. It has also been employed on the concrete runways, taxiways, and apron of a Kansas City, Mo., airport in the resealing of expansion, contraction, and longitudinal joints. On the airport job, costs were kept on the cleaning and sealing of about 150,000 linear feet of all types of joints. The average cost was 4 cents per foot and included all labor, material, equipment, depreciation on equipment, and supervision. The joints were poured with a rubberized sealing compound, and the average daily production for both cleaning and resealing was around 7,800 feet. The work crew consisted of a foreman, 2 truck drivers, and 5 laborers. This type of airport maintenance with concre pavements usually costs from 7 to 10 cents a linear foot.

Colored motion pictures and colored slides showing the new concretegrooving machine at work have been taken on actual jobs. They are avail-able to highway and airport organizations or other interested groups, along with literature about the new machine. This new equipment is manufactured, sold, and serviced by the G. H. Tennant Co., 2592 North Second St., Minne-

The Tennant concrete-grooving machine cleans out irregular cracks as well as joints (left photo). Above: a close-up of the outer head with its six tool-steel cutters which revolve at about 2,200 rpm.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 26.

Help insure America's security and your own. Buy U. S. Savings Bonds.

Truck-Mixer Features Visible Mixing Action

Truck-mixers are discussed in a catalog put out by Concrete Transport Mixer Co., Inc., 4984 Fyler Ave., St. Louis 9, Mo. The catalog lists several features claimed for the Hunkins Hi-Lo mixers, including high discharge, production, and speed, coupled with low charging, ost, maintenance, and weight. It illustrates and describes the unit's visible mixing action.

A drawing shows the principal di-mensions of the Hunkins mixer, and specifications cover the drum, drum liner, mixer shaft, paddle wheels, transmission, catwalks, clean-out lubrication, charging height, discharge height, capacity rating as a mixer or agitator, weight, etc. The catalog also contains several on-the-job photo-graphs of the Hi-Lo mixer.

Copies of this literature on Hi-Lo truck mixers may be had from the com-pany. Or use the enclosed Request Card. Circle No. 30.



- (Model TSA-2)
 - 8 10 ton load capacity
 - 96" x 187" platform
 - Two-way "hydraulic-cushion" platform tilt
- Heavy-duty La Crosse brakes (air or vacuum)
- Weighs 4050 to 4200 lbs.



(Model LTA-4)

- 6 8 ton load capacity
- 78 ¼" x 124 ½" platform
- Hinged drawbar with pull pin for tilting trailer
- Oscillating tandem axle
- Warner electric brakes (Std.)
- Weighs only 3950 lbs.

TURN "DEAD" WAITING TIME INTO PROFITABLE WORKING TIME New La Crosse Tilt Trailers are thrifty to buy . . . easily loaded and unloaded by one man . . . backed by 16 years of La Crosse trailer leadership. Also standard La Crosse low-beds to 67-ton capacities.

LA CROSSE TRAILER CORPORATION, La Crosse, Wis. Send complete information on La Crosse Tilt Trailers Standard Flat Beds We may be interested in a.....ton trailer about.... (date) for hauling..... (type of equipment) Title..... Employed by..... Address.... - H: 11 L-L-Low-Cost TRAILER TRANSPORTATION



Cutting Annual Road Costs at Design Stage

If Location and Design Are Still Adequate When Reconstruction Is Needed, Lower Annual Costs Result

+ HOW does the highway planner or administrator determine how much money he can logically spend on various classes of highways? How does he determine costs annual costs as well as initial capital expenditure? If revenues are inadequate, should he save money by compromising on design? What about initial savings which may ulti-mately result in added annual costs?

These and other basic questions about highway finance received some thorough coverage at the 45th Annual Convention of the American Road Builders' Association last July—in the report of the Subcommittee on Estimates of Costs, of the Committee on Highway Location, Surveying, and Mapping. The report was presented by G. G. Gladman, Engineer of Plans and Surveys, Minnesota Department of Highways.

A convenient formula for determining the capital expenditure which might logically be justified for a given section of highway, said Mr. Gladman, would be an exceedingly useful tool for the highway planner and administrator. Such a formula would necessarily include and require evaluation of the three major factors of benefits, costs, and revenues.

Those benefits that extend to the highway user, can, by use of modern tools, be quite satisfactorily estimated. However, there are a number of in-tangible benefits—such as general public welfare from the standpoint of national defense, ease of intercommunica-tion, distribution of mail, improvement of educational facilities, promotion of commerce and industry, development of natural resources, etc.—which are all difficult to measure in dollars, but which nevertheless are real benefits that the general public derives from highway transportation.

As for costs, the highway planner can do a fairly successful job of estimating them in relation to various design types if by costs we mean initial capital expenditures only. But if we mean annual costs (and these are essential in But if we mean any adequate comparison of design types, said Mr. Gladman) the highway planner must actually have knowledge of or make reasonable assumptions as to the probable or indicated service life of each design type, and its salvage value at the time reconstruction will be required.

As for revenues made available for highway transportation, their amount is substantially dependent on public opinion expressed through legislative action. The highway administrator and planner may possibly render greater service in the future, the report continued, by developing and disseminating to the public more adequate information about its roads.

Sample Problem—Minnesota

In order to study the relationship of benefits, costs, and revenues under existing practices and conditions, the report presented data pertaining to Minnesota - on the theory that basic economic problems are much the same in all the states.

The earnings of a particular section of highway, it pointed out, may be defined as the amount of highway-user tax which traffic will generate thereon. That amount varies in accordance with

traffic density, as shown below: Minnesota Annual Travel Related to Annual Earnings From State Gas Tax and Motor-Vehicle Registration Fees (1946)

Vehicles Per Day	Vehicle Miles Per Year/Per Mile	Annual Earnings at \$0.0044 Per Vehicle Mile
10	3,650	\$ 16 40
25	9,125	40
100	18,250 36,500	80 161
200	73,000	321
300	109,500	321 482
400 500	146,000	642
500	182,500	803
1,000 2,000	365,000 730,000	1,606 3,212
3.000	1,095,000	4 818
5,000 10,000	1.825.000	8.030
10,000	3,650,000	16.060
25,000 50,000	9,125,000 18,250,000	40,150 80,300
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With this basic information, the earnings in highway-user taxes can be computed for each of the systems and shown in the table at the top of the page:

Estimated Earnings in Highway-User Taxes by System of Highways (1946)

System	Miles	Estimated Annual Travel in Vehicle Miles	Estimated Annual Earnings by System	Actual Revenue to Systems
runk highways (including municipal extensions) funicipal streets (non-trunk highway)	11,227	3,521,854,000 2,082,419,000	\$15,560,000 9,200,000	\$24,007,000
ounty system ownship system (ther public roads	7,926 42,292 57,380 2,013	1,077,089,000 423,447,000	4,759,000 1,870,000	7,382,000
Total	120,838	7,104,809,000	\$31,389,000	\$31,389,000
PPL - 6-11	he enterteen 1	1 17-414	-6	

The following table shows the original capital costs and the annual costs for several typical rural design types. These costs do not include bridges. Derivation of the annual costs is indicated in a State of Minnesota Department of Highways Annual Cost Computation Form. It should be noted that design type No. 5 is adaptable to stage construction, and, therefore, initial capital requirements are less than shown.

Tabulation Showing Annual Costs Per Mile by Con-struction Types (1946 Average Costs) Original Costa

Construction Type	Capital 3	0-Year Life*
County Standards	Coat	2320
26-foot top, traffic-bound gravel surface 26-foot top, 6-inch stabilize		\$ 637
granular base, 13/2-inch bitu minous surface	13,218	645
State Standards		
3. 40-foot top, grading and sul	28,789***	915
4. 42-foot top, grading and sul grade stabilization	29,589***	931
 12-inch granular base, 3½-inch bituminous surface 	21,076	760
 22-foot portland-cement concret pavement, granular base, an 	nd .	
shouldering	43,054	1,257
* Straight line depreciation. ** Does not include bridge costs *** Includes right-of-way costs.		

The following tabulation illustrates an important fundamental in the economics of highway transportation, the report points out: It usually costs more per vehicle mile to provide satisfactory highway service on a road with light traffic than on one with larger volume.

No reasonable rates of highway-user

taxes would yield sufficient revenue to pay the annual costs on these lighter-traffic roads. For their support, earnings in highway-user taxes must be supplemented by property taxes and user taxes earned on roads which produce a surplus over annual costs.

Annual Costs Related to Traffic Density

	Rural Design Type	Density Daily Average	Vehicle Miles Annually	Annual	Cost Per Vehicle Mile
No	2 2 2 2 2	50 100 100 200 300 400	18,250 36,500 36,500 73,000 109,500 146,000	\$ 637.00 637.00 645.00 645.00 645.00 645.00	\$0.035 0.0175 0.0175 0.00875 0.0058 0.0044
	3 & 5 3 & 5 3 & 5 4 & 6 4 & 6 4 & 6 4 & 6	500 1,000 2,000 500 1,000 2,000 3,000	182,500 365,000 730,000 182,500 365,000 730,000 1,095,000	1,675.00 1,675.00 1,675.00 2,188.00 2,188.00 2,188.00 2,188.00	0.0092 0.0046 0.0023 0.012 0.006 0.003 0.002

in Vehicle Miles	by System	to Systems
3,521,854,000	\$15,560,000	\$24,007,000
2,082,419,000 1,077,089,000 423,447,000	9,200,000 4,759,000 1,870,000	7,382,000
7,104,809,000	\$31,389,000	\$31,389,000
Estimates	of revenue	accruing to

Minnesota road agencies from 1950-1959 are shown in the following table: Estimated Revenue Accruing to Road Agencies for the 10-Year Period 1950-1959 at Existing Rates and Laws

Motor-vehi Motor fue Miscellane Federal A Total	tax (tr	unk-hi			\$125,375,000 174,675,000 7,000,000 100,000,000* \$407,050,000
	County	Road	and	Bridge	Fund

\$100,000,000 re of motor fuel tax \$197,503,125 Grand total estimated revenue \$604,553,125

*Estimated on basis of Federal Aid Act of 1944 allotments and pending legislation.

(Continued on next page)

200,000,000 watts of electric power

1/4 million horse power in prime movers

...BFM's 1947-8 background for handling your power needs

by selecting your lighting plants and power units from BFM's huge stocks of government surplus and factory new power equipment.

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by buying at prices which are in some cases even below the actual cost of manufacture.

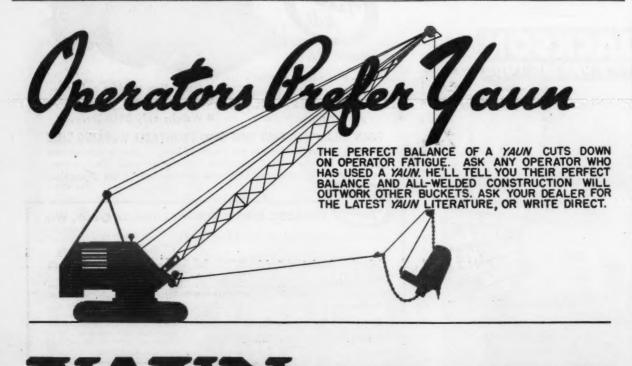
SAVE

· thru BFM.

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BATON ROUGE, LA.

Estimates of Minnesota highway needs on the trunk-highway and county systems are shown in the following table:

Estimate of Minnesota Highway Needs 1950-1959 Inclusive

Construction Maintenance and other \$458,747,000 193,960,000 Total \$652,707,000

| Construction | Section | County Highways | Construction | Maintenance and other | 106,036,060 | Total | \$312,392,016 | Grand Total | \$965,099,016

Revenues Not Sufficient

As the report explains, these data on Minnesota streets and highways can be used as a base for drawing a number of conclusions. The principal one is that existing rates of revenue are inadequate to finance the kind of highway facilities which the public demands, or which our economy requires. It seems that the full impact of depreciation and obsolescence of the physical highway plant—which began to manifest itself before World War II—is now combined with the troublesome depreciation in the purchasing power of highway dollars to constitute a problem of the first magnitude.

Moreover, for many years considerable comfort was derived from the so-called "permanency" of highway improvements, but the ravages of time and the damaging effects of heavy axle loadings (5 to 9 tons) are ever demonstrating that these important elements of cost have not been adequately provided for

Important decisions are involved in answering the question "How much money can logically be spent on various classes of highways?". Benefits may justify a given design type for which the cost can be determined, but revenues on a state-wide basis, and considering the needs of all systems, may not be sufficient. Should the highway administrator and planner therefore build a limited mileage of adequate design? Or must he compromise on design in order to spread the benefits from inadequate revenues? Or should he also essay a new role by compiling and assembling basic facts and presenting them to the public in order to obtain its support for more adequate financing?

Speaking before the Twentieth Annual Highway Conference of the University of Colorado, on the subject of planned highway transportation, Herbert S. Fairbank of the Public Roads Administration said:

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"In the face of an increasing accept-ance of the principle that road revenue should be derived mainly from taxes levied on road usage, user tax rates have been fixed without knowledge of the total of revenue required to effect and maintain any standard of road condition. The expectation of revenue has not been realized by reason of various evasions; and the revenue actually raised has been diverted in part to other than road uses. The remainder available for road purposes has been apportioned among units and agencies of government responsible for road administration in accordance with various legal stipulations determined less upon any consideration of the respective revenue requirements than upon consid-

erations of political expediency.

"In consequence, the revenue receipts of the several units and agencies of administration have borne a various relationship to any actual or reasonable road requirement; and standards of road design, construction, and maintenance have been determined by the possibility of achievement with available revenue rather than by the needs and requirements of efficient usage..."

How to Lower Annual Costs

The final section of the report presented by Mr. Gladman discussed what the highway planner can do, at the location and design stage of his work, to lower annual costs. Perhaps the ideal

is attained, he said, when standards of location and planning are such that subsequent reconstruction can be carried on without revising alignment or widening right-of-way.

Under these conditions, the land acquired for right-of-way may well be the most permanent part of the highway plant. As a matter of fact, it may actually increase in value with the passage of time. However, even when standards of alignment and width of right-of-way are adequate, the investment in highway plant may still be jeopardized by ribbon development, or uncontrolled use of abutting lands. Therefore, a third element must now be recognized to insure protection of the investment in a given highway facility—and that is control of access.

The initial capital expenditure for grading and drainage can probably be preserved through adequate maintenance. The life of structures will depend on the durability of materials used in their construction. This leaves base and roadway surface as the principal

depreciable elements of the highway plant, provided the other elements just described remain usable.

Annual costs will be reduced if design speed, sight distance, and other related design features are adopted for the original improvement which will

still be adequate when reconstruction of the surface becomes necessary. For when traffic growth requires the reconstruction of a two-lane single roadway into four lanes divided, salvage values may depend a great deal on standards

(Concluded on next page)





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Cutting Annual Road Costs at Design Stage

(Continued from preceding page)

used in the overall design.

The ideal just described has its antithesis in a situation where it becomes necessary to scrap a high-type concrete pavement on account of substandard alignment in relation to design speed or sight distance. Here may be involved the loss of substantially all of the initial capital investment and even the additional expense of removal and disposal of the pavement.

Another element that may terminate the service life of a pavement is substandard cross-sectional design, which results in fixing the grade line—generally so low as to make modernization of the cross-sectional design difficult if not impracticable.

Vertical Alignment

When we consider that program budgets allow certain maximum amounts that can be spent for improving a specific section of highway, and that the simplest way to obtain agreement between design cost and budget amounts is to skimp on vertical alignment, the result is obvious. This can, and does happen. But many of these initial savings may ultimately result in added costs, the report points out, and to demonstrate this, it cites a hypothetical case—again in Minnesota.

Suppose the highway planners save

\$3,000 per mile in grading costs by adjusting vertical alignment from a 60 to 50-mile-per-hour non-passing design speed. Now a 50-mile-per-hour nonpassing design speed will not affect a large portion of road users in Minne-sota. During 1947 only 30 per cent of passenger-car drivers exceeded this speed. Nonetheless, it is necessary, upon opening this mile to traffic, to place "No Passing" or "50-Mile Zone" signs as a safety measure. But the story doesn't end here. Human nature being what it is, it is difficult to enforce driving habits with signs, and ultimately there is another accident-prone mile.
On rural Minnesota highways during

the first three months of 1948, said Mr. Gladman, 30 per cent of the accidents occurred at locations involving crests of hills and curves on grade. Of the 463 reported accidents in this category, 10 were fatalities. This is not to say that deficient sights contributed to all these

accidents. Yet it is significant that they occurred at locations having elements of restricted sights.

The report then considers the hypothetical case from still another angle. Suppose, after 10 years of service, it omes necessary to put in a grade revision to eliminate congestion. This grade revision makes it necessary to take out the original 12,000 cubic yards originally saved. The excavation, it is assumed, can be taken out for the \$3,000 saved. But what about the subgrade preparation and concrete slab? A breakdown on the basis of annual costs reveals that (1) the annual cost of the project with a 60-mile design speed is \$1,986; (2) the annual cost as built is \$1,926; (3) the annual cost as built and corrected is \$3,021 with added capital expenditures of \$13,759; and (4) rather than a saving of \$3,000, a net added capital expenditure of \$10,759 has been

A review of the U.S. Public Roads Administration Index of price trends in highway construction shows that by 1940 excavation costs had dropped substantially below a 1925-29 base. Much of this downward trend resulted from changes in road-building equipment, Mr. Gladman reminded his listeners. While present costs are approaching those of the base period, there is reason to believe that in the leveling off of prices during the next few years the cost of excavation will again drop to lower levels. The excavation item probably accounts, on the average, for one-half or two-thirds of total grading costs. Therefore, an increase of 25 per cent in grading costs would increase the total cost of the project by only 12 per cent. "It appears from the discussion thus far," the report concludes, "that emphasis should be placed on both horizontal and vertical alignment in longrange planning."

Three Changes for Atlas

Three personnel changes in the Explosives Sales Division are announced by the Atlas Powder Co. of Wilmington, Del. D. J. Carroll Copps has been appointed Manager of the Joplin, Mo., District. He succeeds R. E. Caskey, who is taking over general advisory duties on explosives sales in the midwestern Mr. Copps is succeeded as Manager of the Chicago District by John F. Flippo, formerly Assistant Manager of



Another 12 yards of dirt is dumped on a stockpile for future borrow—by Erie S-91 scoop drawn by an International TD-18 tractor. The job: exc \$1,500,000 addition to St. Joseph's Hospital in Omaha, Nebr. The dire r: Miller Excavating Co. of Omaha. The operator: Alfred Clausen



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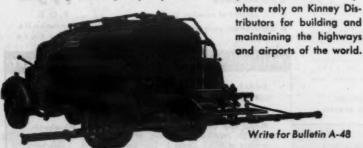
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Grasses and Legumes Studied by Road Dept.

Grasses and legumes for roadside use are the subject of a research project initiated by the Pennsylvania Department of Highways, Forestry Unit, and the Pennsylvania Agricultural Experi-ment Station of Pennsylvania State College. Results of the tests will be used to determine the best permanent cover for use on the steep slopes of highway and fill sections; the best seeding methods and ways to protect new seedings against washing out before they are established; and, in the cases of wild grasses, whether or not they can be produced economically on a practical scale.

The first series of experiments are located on Highway 220, near Port Matilda, Centre County. Five species of grasses and one legume, crown vetch, are being studied there. These were selected as the species "most likely to succeed", and to provide a permanent cover, because of their known tolerance to a wide range of environmental conditions.

Two seeding methods and means of mulch protection are part of these ex-periments. In the first, a conventional type of seeding was used: sowing the seed on a prepared surface, raking it in, and applying a straw cover for proafter the seeding operation. The second method consisted of applying the mulch and seed in one operation, using the unthrashed straw of various species with seed in it. The test also includes a comparison of two rates of mulch application-1 and 2 tons per

Because of the excellent results secured with mulch seedings and the significantly lower costs of seeding operations by this method, a second series of experimental plots have been established to determine the practicability and cost of producing the seed-mulch material. These tests were established in May, 1948, and are located on the college farms. They consist of both row and broadcast plantings of the various species used in the slope tests, and are designed to provide information on methods of handling the material from field to roadside. This will entail studies of harvesting periods for maximum seed yield and quality, seed losses due to handling, methods of harvesting and curing, and other pertinent

Bonded Disk Wheels For Rotary Sanders

A bonded disk wheel for rotary sanders has been developed by Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J. The Moldisc has a free-cutting quality, says the manufacturer, who recommends the unit for grinding stainless steel and other alloys which must be ground and finished without generating excessive heat. The manufacturer also states that the wheel can be specified for roughing and fast metal removal as well as for finishing

NY

Other advantages claimed for the Moldisc include long life, uniform cutting action, high production, low grinding costs, ease of handling, less operator fatigue, and greater safety. The Mol-discs are supplied in a standard size diameter and 1/4 inch in inches in thickness, with a %-inch hole.

speed which the company recommends for the 7-inch disk is 6,000 rpm.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 47.

Accidents don't just happen; they are caused. Remember-safety always pays.

President for Hill Diesel

Alexander B. Zeitlin has been elected President and a member of the Board of Directors of the Hill Diesel Engine Corp., Lansing, Mich. Mr. Zeitlin is also a Vice President and Director of the Drake America Corp.



This lock, cut through a levee, forms a link that permits uninterrupted naviga-tion between the Mississippi River and the Gulf Intracoastal Waterway, lying west.

In telescopic leads the 9-B-3 McKiernan-Terry Double-Acting Hammer, submerged, drove 78-foot piles to 29-foot cut-off below water, or until the point of pile was within one foot of the bottom of the excavation. Later, this hammer drove steel sheet piling for cut-off walls. The hammer and pile driving rig were powered by two Lambert-National Engines and oil fired boilers-products also of McKiernan-Terry Corporation.

This difficult project is typical of countless jobs for which engineers and contractors unhesitantly select McKiernan-Terry Pile Hammers. For the standard McKiernan-Terry line of ten double-acting hammers, five single-acting hammers and two double-acting extractors gives a choice in size and power to meet any specific needs.

FURTHER INFORMATION

end for latest literature giving specifications, etc. on McKiernan-Terry D ble-Acting and Single-Acting Pile Hammers.





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McKiernan-Terry PILE HAMMERS AND EXTRACTORS









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Earth-Boring Unit Is Truck-Mounted

An earth-boring machine designed for mounting on 1½-ton truck chassis is manufactured by the California Welding & Blacksmith Shop, Inc., 7222 E. Slauson Ave., Los Angeles 22, Calif. It is designed for sinking caissons, for building construction footings, for drilling shallow water wells, for soil testing, and for other earth-boring operations. According to the manufacturer, the rig will drill holes from 10 to 72 inches in diameter and 200 feet in depth. The width of the hole is determined by the size of the drilling bucket and reamer used.

The California earth-boring machine has a 32-foot collapsible derrick with a 20-ton capacity in drilling position. Capacity of the ring-gear drive is listed at 9 hp at 100 rpm. The ring gear is cast from a 1040 carbon steel and is mounted on 185 ball bearings, each measuring % inch in diameter. The 2-drum hoist is rated at a pull of 2,000 pounds at a line speed of 175 fpm. The power unit is a 100-hp Ford Mercury gasoline engine.

The standard kelly bar is 3 inches square and 22 feet long. It will drill to a depth of 22 feet without extra drill stems, the manufacturer states. A telescoping kelly is available which will drill to a depth of 42 feet without extra drill stems.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 42.

Recommended Practices For Snow and Ice Control

Practices recommended for snow removal and the treatment of icy pavements are discussed in a pamphlet issued by the Highway Research Board. It is part of the "Current Road Prob-lem" series and is listed as No. 9-2R, second revision. The reports in this series are not intended to reflect average prevailing practice but, rather, to recommend practices based on the best current knowledge.

Recommendations presented in this pamphlet cover organizational personnel, training programs, drift control, markers for drainage and structures, drainage facilities, plan of operation, use of weather reports, night patrols, public warnings, types of equipment, lighting and color scheme of equipment,

dispatching of equipment, control, plowing, and reports on snow removal.

Copies of this booklet can be ob-

tained by writing to the Board at 2101 Constitution Ave., N. W., Washington 25, D. C. Cost of Pamphlet 9-2R, second revision, is 15 cents.

Kauer Returns to Ohio

Theodore J. Kauer has been appointed Director of Highways for the State of Ohio. Mr. Kauer served with the Department from 1927 until 1940, when he left for service in Washington, D. C.



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in tunnels, mines, shafts and foundations. It can be used on railroad subgrades and can be easily converted into a "pea

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Hard wet cylinder sleeves, hardened crankshaft with precision bearings, simple overhead valve mechanism, gear-driven water pump cooling, and pressure oiling—all the features that make it easy to understand and simple to service. Get the whole story in Bulletin 1415.

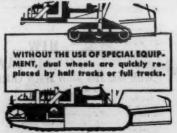
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Steel-Girder Bridge Replaces Truss Span

Concrete River Piers for 602-Foot Structure Rest On Rock; End Bents Are Built on Steel H-Piles

→ BROAD River in the northwestern part of South Carolina is now crossed by a new bridge on State Route 18, 5 miles north of Gaffney in Cherokee County. The new 602-foot steel-girder structure, supported on concrete piers, is located about 400 feet east or downstream of the old steel-truss bridge which it has replaced. The former 20-year-old span consisted of two 200-foot pin-connected trusses with a 14-foot 6-inch plank-floor roadway.

It was in need of replacement, but was kept in use until May 8, 1948, when a truck crane which belonged to the contractor building the superstructure of the new bridge struck the upstream end post a glancing blow. Suddenly the north 200-foot truss began to slide off the center river pier and abutment on which it rested, Within a few minutes the long steel framework had slid into the river, which averages 4 to 5 feet in depth. Fortunately no traffic was on the bridge at the time.

The mishap closed State Route 18 at the banks of the river, compelling traffic to detour 7½ miles around on U. S. 29 and State Route 5. The Broad River is also crossed on U. S. 29 between Gaffney and Blacksburg, S. C., so the loss of the old bridge was not felt too greatly during the period before the new one was completed.

Two Contracts

In constructing the new Broad River bridge, the South Carolina State Highway Department awarded two contracts—one for the substructure and the other for the superstructure. The Department itself supplied the structural steel for the superstructure, having ordered the material well in advance of construction in order to expedite the work. The Virginia Bridge Co. furnished the 542,000 pounds of structural steel, which it fabricated at its Birmingham, Ala., plant and shipped by rail to a siding of the Southern Railway at Blacksburg. From there it was hauled in trucks 5 miles to the north end of the bridge. The cost of the steel, less erection, field painting, etc., was \$44,211.32.

The substructure contract went to C. Y. Thomason Construction Co. of Greenwood, S. C., for \$63,859.50. This included the construction of six reinforced-concrete piers which rest on rock, and two steel-pile end bents driven through the approach fills and surmounted by concrete caps. This phase of the project got under way on July 1, 1947, and was completed on March 13, 1948. During this period there was a three-month shutdown because of rain and high water.

A contract for the superstructure was awarded to F. A. Třiplett, Inc., of Chester, Inc., on a low bid of \$70,993.28. This included erecting and painting the steel girders and other members, and pouring the 6-inch reinforced-concrete deck slab which measures 26 feet from curb to curb. On either side are 2-foot 6-inch sidewalks running the full 602-foot length of the bridge, protected by concrete posts with metal pipe railing. Work on this contract started late in March, 1948, and was scheduled for completion in October.

The total cost of the new bridge is estimated at \$195,000. This includes the cost of the structural steel, the two contracts for substructure and superstructure, and about a mile of approach embankments required for the new location of the span.

Substructure Contract

The six reinforced-concrete piers were lettered from A through F, beginning at the south end. The abutment end bents were numbered 1 and 2, south and north respectively. Going from south to north the lengths of the individual spans are as follows: two at 50 feet, one at 105 feet, two at 120 feet, one at 105 feet, and one at 50 feet. All the spans have structural-steel superstructures except the 50-foot spans, which consist of four concrete girders poured monolithically with the deck slab.

The design of the bridge is for H15-

The design of the bridge is for H15-S12 loading, according to the AASHO standards of 1941. Its profile is on a 1.16 per cent grade rising from the south or Gaffney end to the north bank. The piers consist of two shafts connected by



This general view of the new Broad River steel-girder bridge in Cherokee County, S. C., shows the derrick used in steel erection, falsework, and a girder in place. At the extreme right, forms are under construction for the concrete beam span.

a web wall, and each shaft has an individual footing which rests on rock. Pier F is the tallest of the structures, meas-

uring 45 feet 7 inches from the bottom of the footing to the top of the concrete. (Continued on next page)

Can you afford to bid 33% higher?

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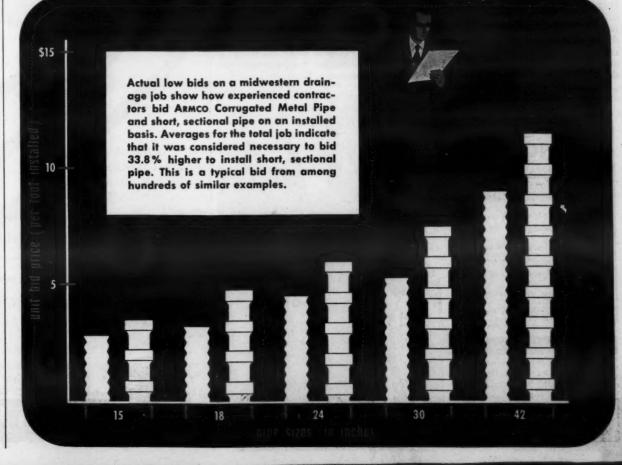
ARMCO Corrugated Pipe and PIPE-ARCH are supplied in any length that can be hauled and handled. No large and expensive-equipment is required for installation. A few men with a rope sling or a small A-frame can handle the largest structure. Connections are made with simple band couplers. Where end finishing is needed, prefabricated ARMCO End Sections are simple to install.

Use ARMCO Drainage Products on highways, railways, airports and wherever else you need economical, easy to install drainage structures. Write for complete data: Armco Drainage & Metal Products, Inc., 815 Curtis Street, Middletown, Ohio.

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ARMCO CORRUGATED METAL PIPE





Steel-Girder Bridge Replaces Truss Span

(Continued from preceding page)

Because of the topography, pier F is higher than either of the two river piers, C and D.

In constructing the two river piers, the contractor built a dirt ramp out in the water from each of the banks. The heavy equipment operated off these two work fills. Cofferdams for these two piers were made up of parallel timber walls about 6 feet apart and lined with wooden sheeting. The space between the walls was filled with impervious clay. The timber rings were assembled on shore and set in position for driving the sheeting.

Concrete was mixed in 1-yard pavers and discharged into bottom-dump buckets which were lifted to the forms by a crane. Since the footings were supported on rock, no seals were necessary.

Steel Superstructure

F. A. Triplett, Inc., contractor on the superstructure, sublet the steel erection to Harvey H. Stewart of Charlotte, N. C. The latter unloaded the members from the railroad cars at the Blacksburg siding, hauled them to the north side of the job, erected and bolted them together, then riveted and painted them.

The girders for the two 120-foot spans between piers C and D, and D and E, are of course the largest on the bridge. Each 120-foot girder contains both a straight and umbrella section—the latter portion being over the pier—and weighs about 25 tons with a maximum depth of 5 feet 6½ inches. The two girders for each span are set on 23-foot centers, back to back of bearings. Equally spaced between the girders are four 14-inch WF 30-pound steel stringer beams. The floor beams are either 27-inch WF 94-pound or 24-inch WF 84-pound steel sections, spaced every 15 feet. The 6-inch concrete deck slab rests on top of this framework.

The elevation of the lowest point of steel on the bridge is 578. This is well above the maximum high water recorded on the river which was 573.5 elevation in 1939.

Erecting the Steel

As the steel girders were trucked to the bridge site, they were unloaded directly in the shallow river between the piers where they were to be erected. By placing them there, double handling of material was avoided. The derrick used in the erecting had only a 270-degree swing which prevented it from reaching back and moving the steel ahead—something it would have had to do if the members had been left on

shore. Any river mud that accumulated on the steel was carefully washed off with soap and water before painting. Besides the shop coat, the members were given a field coat of red lead and two coats of aluminum paint.

A General truck crane with a 35-foot boom was employed to handle the smaller steel pieces on the spans over land. The bulk of the steel erection was done by a stiffleg tripod-type steel derrick 35 feet high, supporting an 85-foot boom. It was rated at 30-ton capacity at a 38-foot radius, and was operated by a two-drum gasoline-engine hoist. The work proceeded from the north to the south bank of the river, with the derrick sliding ahead on the girders.

Concrete Spans

To support the form work for the three concrete spans over land, two at the south and one at the north end of the bridge, timber falsework of pine posts was constructed. Under each of the four concrete girders, five posts or piles were set up. They averaged about 35 feet in length, had 14-inch butts and 10-inch tips, and were handled by an Insley crane with a 35-foot boom. Where there was some dirt cover over the rock, the piles were driven with a drop hammer; otherwise they were erected as posts. On top were placed caps of double 10 x 10's, and the entire falsework system was cross-braced with other timbers.

The concrete girders are 2 feet 634 inches deep x 1 foot 5 inches wide, and are spaced 7 feet 436 inches on centers. Where the concrete spans meet the steel spans, the piers are built up higher on the concrete side to compensate for the difference in depth between the concrete and steel girders. At the steel-pile end bents the concrete girders rest on concrete caps 2 feet 4 inches wide x 2 feet 6 inches deep.

Concrete for the superstructure pours was mixed in either of two mixers—a 3-bag Rex on the south side of the job and a 2-bag CMC on the north side. Sand and crushed limestone for the aggregate were weighed out on a Winslow batcher that held 10 tons of sand and 20 tons of stone. The sand was procured from Foster Bros. of Dixiana, S. C., and shipped by rail to the Southern Railway siding at Gaffney. From there it was trucked to the job. The stone was purchased from the Campbell Limestone Co. in Gaffney, and delivered to the job in trucks. Atlas high-early bag cement was supplied from the mill at Leeds, Ala., and shipped by rail to Gaffney. The reinforcing steel, furnished by the Virginia Steel Co., was shipped in the same way from Birmingham, Ala. Water for the mix was pumped from the Broad River.

AN CONVEYOR

Concrete was mixed on either side of the river, with the equipment set up on the approach fills close to the end bents. The concrete was discharged into rubber-tired buggies, which were wheeled to the wooden forms. As the concrete was placed, it was vibrated with Mall vibrators. Curing was done with Truscon Tru-Cure. During these operations the contractor's men used a surplus Navy 20-man life raft strung on a cable to get back and forth across the river after the old bridge had fallen into the water.

Quantities and Personnel

The major items in the C. Y. Thoma-(Concluded on next page)



The fourth of a series in the interest of more efficient use of steel . . . a vital American resource.



The actual inherent strength of rail steel is fully harnoused for work in the Laclede Multi-Rib bar design. Rail steel rolled (into pars with Multi-Rib design of the avial strength in excess of 55,000 PSI—with greatly increased at harage. Lacled Multi-Rib Reinforcing Bars meet the new ASTM Specification A 300 T, which provides a long-needed yardstick for anchorage in reinforcing bars, as the amore efficient use of steel.



Modernize your specifications with ASTM A 30 Modernize your steel reinforcing with Laclede Multi-Rib B

LACLEDE STEEL COMPANY



son substructure contract included the following:

Excavation 1,100 cu. yds.
Concrete 690 cu. yds.
Reinforcing steel 48,433 lbs.
Steel H-piling, 10-inch, 42-pound 460 lin. ft.

The F. A. Triplett, Inc., contract for the superstructure included the following major items:

Concrete
Reinforcing steel
Pipe handrail

530 cu. yds.
113,273 lbs.
1,204 lin: ft.

H. Ellison was Superintendent for F. A. Triplett, Inc., while Charles Casey was Superintendent for Harvey H. Stewart, subcontractor on the erection of the steel.

For the South Carolina State Highway Department, T. L. Walton was Resident Engineer and Marion M. Slattery was Inspector. The Department is headed by C. R. McMillan, Chief Highway Commissioner, with S. N. Pearman, State Highway Engineer. J. D. McMahan, Jr., is Construction Engineer and W. J. Gooding is Bridge Engineer.

New Rotary Scrapers

Light-duty scrapers are available from the Marvin Ellis Mfg. Co., 216 E. Harrison, Guthrie, Okla. The Memco Roto-Grader is made in 3, 4, 5, and 6 cubic foot sizes with capacities of 8, 12, 16, and 30 cubic feet. All are designed for use with light-duty rubber-tired tractors. According to the manufacturer, the Memco Roto-Grader obtains a capacity load with the cutting angle set to make a 6-inch cut. The loading may be regulated to any amount between 0 and 6 inches by setting the loading dogs.

The Roto-Grader is controlled by two levers. The front lever controls the digging, and the rear lever controls the rotation of the bowl. The unit can be used to spread a load of dirt, to dump it in a pile, or to backfill a hole or trench. If the trip dogs are locked, it can also be used to bulldoze a load.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 51.

All-Plastic T-Square

An all-plastic T-square has been placed on the market by Instrumaster Industries. 2456-139 W. Jackson Blvd., Chicago 12, Ill. It is molded in one piece of shatterproof plastic, the company points out, and is transparent, has two working edges, and features extended ribs to prevent ink smearing and other smudges.

According to the manufacturer, the T-square will remain accurate even if it should be dropped, because of its one-piece construction. The ribs are protruded 0.020 inch to provide the non-smearing feature. The Instrumaster T-square is available in two sizes—18 and 24-inch lengths.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 108.

Loaders Are Truck-Mounted

ib

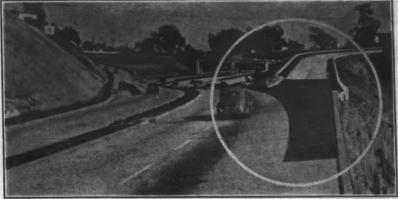
Truck-mounted bucket loaders are listed in two bulletins prepared by Eagle Crusher Co., Inc., 900 Harding Way East, Galion, Ohio. Form 947 describes the Model 400 equipped with twentynine 20-inch buckets; Form 444 describes the standard-model Eagle loader with thirty-five 16-inch buckets.

Both catalogs present specifications

both catalogs present specifications for the type of truck on which the loaders can be mounted, the source of power and how it is transmitted, the frame, safety clutch, sprockets, spiral feeders, and the buckets themselves. Also illustrated and described are the location and operation of the controls, standard and optional equipment, features of operation, and job applications. Both catalogs contain job photographs.

alogs contain job photographs.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 22.



Motórists on the Cabrillo Freeway near San Diego, Calif., can spot highway exits in plenty of time by their reddish-brown color. Remiko stain was used in the concrete.

Concrete Is Stained At Expressway Exits

The use of concrete coloring to mark traffic exits and help to reduce accidents is being tested by the California Department of Public Works. The Department has approved the use of concrete coloring on sections of the Cabrillo Freeway near the San Diego city limits. The coloring is applied to highway exits to make them easier to see and to give motorists ample warning to get into the proper lane.

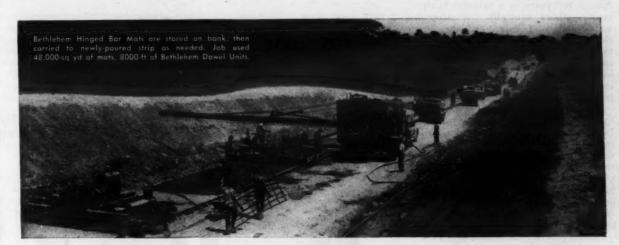
The coloring material used on the job is called Kemiko. It is manufactured by Rohloff & Co., 918 N. Western Ave., Los Angeles 27, Calif. It is described as a chemical solution which penetrates the pores of the concrete and, through a chemical reaction, becomes a permanent part of the concrete itself. It is said to increase visibility and reduce glare and to be durable under traffic. The color selected for the Cabrillo

The color selected for the Cabrillo Freeway is a deep reddish brown. It was applied by the Bashet Bros. Construction Co. for the San Diego County Road Department, under the supervision of District Engineer E. E. Wallace

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 63.

New Home for All-State

A new company headquarters building has been completed by All-State Welding Alloys Co., Inc. It is located at 273 Ferris Ave. in White Plains, N.Y.



3 Miles of New Road on U.S. 322



Mapping out the day's operations. Left to right: William Berlanti, contractor; Harold V. Runner, resident engineer, and W. Ralph Eccles, district construction engineer, both of Pa. Dept. of Highways; and Eugene Kohles, carpenter foreman.

In order to provide a better, safer road for the heavy volume of traffic using U.S. 322 between Chester and Concordville, Pa., the Pennsylvania Department of Highways recently called for three miles of relocation in the Concordville area. The new road is virtually free of turns, and its construction included the erection of four bridges and three culverts. Contractor for the project: Berlanti Construction Co., of Harrison, N. Y. The bridge reinforcing, as well as bar mats and dowel units, were supplied by Bethlehem.

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Trucks are loaded fast in this well-equipped batching plant adjacent to



ahead of the fast-moving paver shown near brow of hill.



One of four bridges in the making. With Bethlehem Reinforcing Bars in

Foundation Problem At Mineral Springs

Warm Mud and Water Make **Bad Foundation Problem** As Bath Hospital Rises Over Healthful Springs

+ WHEN Askevold Construction Co. of Missoula, Mont., began construction of a new \$350,000 bath hospital over a mineral spring in western Montana, officials had no idea the foundation problems would be bad. The unusual formation over which the new building was built, however, posed a tough and interesting situation.

The new mineral-bath house was built for the Hot Springs Corporate En-terprise, a wholly owned subsidiary of the Confederated Salish and Kootenai Tribes. It is located in the city of Hot Springs, Mont. Hot Springs has been famous for years as a mineral health center, whose naturally hot mineral water and mud cured arthritic and rheumatic sufferers. Patients have come to Hot Springs from all over the nation and from foreign countries. The new building replaces obsolete facilities operated for the past two decades by the Indian business enterprise.

The new bath building was designed

by the Chicago architectural firm of Perkins & Will. It is a three-story building, built of reinforced concrete, with various other materials including ceramic tile partitions. The new building has a large reception foyer with a fireplace on the second floor, two bathing floors each containing 16 tubs, and an open patio on the lower floor in which patients can sit in the sun.

For the concrete floor slabs, which are supported by concrete pedestals, the forms were lined on the under side with Masonite. The pours were designed to strip out so well that nothing but con-crete paint was necessary to blend the material into the new building's swank interior.

A 50-foot-high brick chimney at the north side of the building removes heat and smoke from the oil-fired central boiler room, and the fireplace also discharges smoke to this high stack.

Foundation Is Bad

The building is situated directly on top of a soft, quaky ooze formation, through which the hot mineral waters flow. Since the building contains about 700 cubic yards of reinforced concrete, heavy pile foundations were necessary under each column.

Plans called for four treated-cedar piles under each of the support columns, driven to a penetration of about 50 feet. Before the piles could be driven, some structural excavation was necessary. A Northwest Model 25 machine with a 60-foot boom and a clamshell bucket moved in, but as fast as it could muck the mud away, other mud boiled up from underneath. The entire area soon got soft and quaky, and it was necessary to bring in pads to support the North-

west clam.

Several 3-inch centrifugal pumps were then brought in and set up within

the area. A discharge line was also laid, to dump the water off in lower country. The pumps dried up the area enough to get the piles driven, but heavy spring rains made the job difficult. It was practically impossible to dig a sump, and the area was never really dry.

The cedar piles were picked up by the Northwest crane, set in place, and driven down with the aid of a set of stationary leads and a 1½-ton drop hammer. Frequently the piles sank 10 feet from their own weight. Th driven through the ooze and blue clay to bearing on a stratum of coarse gravel about 50 feet underneath the surface of the ground. Each pile was driven to develop a minimum of 40 tons of bearing, possible only because of the gravel stratum far underneath.



Askevold Construction Co. Photo
This view from an old swimming pool shows the unusual three-floor construction of the

But the foundation job was far from finished once the piles were driven. The concrete floor slabs, with thickened sections under the 16-foot center pedestals,

had to be poured. The worst spot of all was the boiler-room floor, several feet lower down than the adjacent slabs. (Continued on next page)





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The Jaeger Machine Co. Columbus, Ohio

The T. L. Smith Company Milwaukee, Wis.

The Knickerbocker Co. Jackson, Mich.



C. & E. M. and Askevold Construction Co. Photos
The plumber shown above cuts a 4-inch galvanized pipe for the new mineral-bath house at
Hot Springs, Mont. The framework pictured at right was used in constructing the brick
chimney and in hoisting materials.

While the pumps worked steadily, Askevold hauled in many truckloads of fine crushed gravel and backfilled the clammed-out areas to grade. Then, be-fore the mud could ooze in, the concrete slabs were placed and finished off, safe against the intrusion of ground water for years to come.

f all feet labs.

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On several of the slabs, the founda-tion had to be prepared in sections, and small parts of the slab placed as founda-tion work progressed. There was also a time when foundation preparation and slab concreting went on simultaneously.

Steel forms, or shells, were used in forming all the round columns. Square columns in other parts of the new build-ing were formed with wood panels, faced with plywood. The under side of the two upper floors was formed with

CUSTOM-BILT

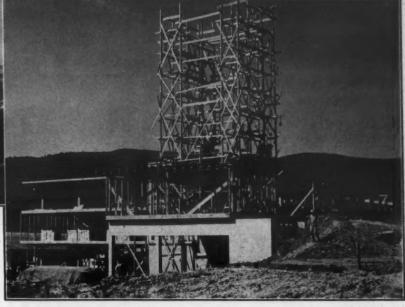
Masonite surfacing, and this material was also used on the exposed surfaces of walls.

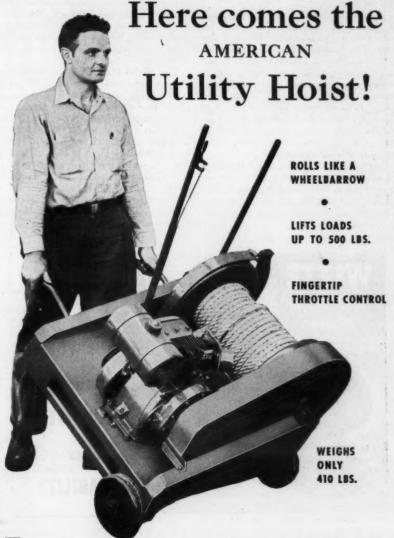
The floor pours were supported on 4 x 4 shoring, spaced from 5 to 6 feet. Later on, some of the same material was used to build scaffolding supports on the outside of the building, from which the glaziers and other building artisans worked.

Concrete equipment was modest, but was ample for the pours to be made. A small 3-compartment Butler batch plant, with a total capacity of about 45 tons in its bins, was brought in and set up. Sand and % to 1-inch rock aggregate was trucked in, then loaded to the bins by the Northwest clam. A Jaeger 17-E concrete paver took the material and mixed it with water, turning out the finished concrete. It was hoisted to the

(Concluded on next page)







The AMERICAN UTILITY HOIST will lift brick, tools, cement blocks, roofing or any other load up to 500 lbs. more profitably than any big hoist on the market. And compared to hand work, it's worth two or three extra men on the payroll.

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Foundation Problem At Mineral Springs

(Continued from preceding page)

pouring platform by a Quick-Way truck crane, using a Gar-Bro transfer bucket and a small hopper. Once it was lifted to this hopper, the concrete was buggied to slabs and walls under construction.

Columns were always poured at least 2 hours before the slabs or other members which they supported were placed. This was done to let the columns harden somewhat, and shrink.

A concrete mix of 1:2:3½ was used, with 6.25 sacks of cement per cubic yard. With a 6-gallon water-cement ratio, this produced 2,500-pound concrete, strong enough to meet the specifications. All concrete was internally vibrated, during placement, by a Mall vibrator.

The extensive plumbing installation, involving bathtubs, piping, pumps, and waste lines, was done under a subcontract to the Fullerton Plumbing Co. of Hamilton, Mont. All electrical work was done by the Allen Electric Co. of Hot Springs.

Within the bathing rooms, each tub is housed in its own private cubicle, with glazed-tile partitions between the tubs. The healthful mineral waters are now available to patients with a far more modern degree of comfort than has ever been the case in the past. Patients have their choice of a mineral-water bath, a healthful mud bath, a siesta in front of the fireplace overlooking an outdoor pool, or a sun bath in the patio on the lower floor. The grounds will be landscaped.

Started in November, 1947, the new building was scheduled for completion by January 1, 1949. Construction for the contractor was under the general direction of S. M. Askevold, with Ed Waller as Superintendent.



C. & E. M. Photos

A carpenter (left) works from a scaffold at the new Hot Springs mineral-bath hespital. Job personnel in the other photo are, left to right, Ed Waller, General Superintendent; G. W. Bonnes, Electrical Superintendent; and T. H. Pullerton, Plumbing Superintendent.

boards in place of cutting blades. The Angl-Bars are made in standard lengths of 4, 5, 6, 7, and 8 feet.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 3.

Gravity's

Spring-Steel Brooms

Spring-steel drag brooms for use in leveling operations before rolling for final finish are available from the Traffic & Road Equipment Co., 6 Beacon St., Boston, Mass. The Kinney spring-steel brooms are made in several sizes and are designed for installation on drag frames of any size. The standard Kinney broom is 15 inches long and 3 inches wide, has a 4-inch blade projection, and is equipped with bolts for installation on drag frames.

The Model P all-steel broom for use on graders, tractors, trucks, etc., is 12 inches long, has a 4-inch spring-steel blade projection, is 6 plies thick, and weighs approximately 4 pounds. It also comes in a 15-inch size. The Model J all-steel-head hand broom is 15 inches long, has 4-inch spring-steel blade projections, and is equipped with a handle. It is lightweight and easily handled. The Traffic & Road Equipment Co. is

The Traffic & Road Equipment Co. is also prepared to supply Angl-Bars, with or without brooms attached, of proper angle for mounting on mold-

A Model 3500 Manitowoc Crane equipped with a Twin
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Two-Lane Road Made Into a Dual Highway

Maryland Constructs a New 24-Foot Concrete Pavement Alongside Existing 2-Lane Road; Divided by Parkway

+ ON Alternate U. S. 40 west of Baltimore, a 4.998-mile stretch has been converted from a two-lane to a four-lane concrete highway. A 24-foot concrete strip was added to the west-bound lane

opposite the existing 24-foot pavement.
The dual lanes on the 1.046-mile stretch located in Baltimore County are separated by a median strip. For 4,650.01 feet, this strip consists of a grass center parkway 36 feet wide; it then tapers to 6 feet wide in 600 feet, and becomes a grouted-rubble-masonry median from 6 feet to 4 feet wide 242 feet farther west at a cross-over. The dual lanes on the 3.952 miles located in Howard County are also separated by a median strip. This consists of a 4 to 6-foot-wide grouted-rubble-masonry median for 1,711.5 feet to the beginning of the grass center parkway. Then it widens from 6 to 36 feet 1,350 feet farther west.

ured

Grading for the widening was done during 1938 and 1939, but it was not until March, 1948, that preparation for concrete pavement got under way. The Maryland State Roads Commission awarded a contract to Hechler Brothers of Richmond, Va., on the low bid of \$461,178.20. The paving was all poured by October 14, 1948, and the entire project was completed by November 15, 1948.

Grading and Foundation Course

The roadbed for the new pavement, which lies north of the existing road, had been graded a little high in the original earth-work contract. Then too, a 3-inch foundation course included in the new highway design required that additional material be scraped off. An average depth of one foot was removed over the whole job, and the material was wasted in low spots along the fills. The excavation item in the contract totaled 53,000 cubic yards.

A Link-Belt Speeder ¾-yard shovel excavated the surplus dirt and loaded it into four 4-yard trucks and two Caterpillar 10-yard wagons pulled by DW10 rubber-tired tractors. The average haul was ½ mile. Dozers pushed the material off the fills, and the finegrading was completed by two motor graders -a Caterpillar No. 12 and a Galion No. 101.

Stone screenings for the 3-inch foundation course were purchased from the Green Springs Avenue, Baltimore, Md., quarry of the Arundel Corp. of Baltimore, Md. The material was delivered to the job by George Hoffman, a Baltimore hauling contractor, who employed eight trucks for the 10-mile average haul. The screenings were dumped in small piles on the road and spread by the motor graders to a width of 26 feet, or one foot beyond the pavement line on each side. The course was compacted by a Buffalo-Springfield 10-ton threewheel roller.

The gradation of the screenings was as follows:

Sieve Size Per Cent Passing 34-inch

Batch Plant

In preparation for the paving, the contractor set up a batch plant along U. S. 40, near the middle of the job. A Blaw-Knox 60-ton 3-compartment aggregate bin held the sand and the two sizes of crushed-stone aggregate, while the cement was stored in a Blaw-Knox 300-barrel cement bin. The cement was

shipped in bulk-cement cars from the Lehigh Portland Cement Co. plant at Pa., to a siding of the Pennsylvania Railroad at Catonsville, Md. It was unloaded there into a Blaw-Knox 400-barrel cement bin by a screw conveyor under the tracks and an enclosed elevator. Two covered trucks, holding 5 tons each, hauled the cement 7 miles from there to the batch plant. They dumped the material into a hopper, and a screw conveyor and enclosed elevator moved it to the 300-barrel storage bin.

Arundel Corp. of Baltimore furnished the fine and coarse aggregate, with trucks delivering the material to the job where it was stockpiled around the



storage bin. A Marion crane with a | rial. The gradation of the sand and the 65-foot boom and a 1½-yard clamshell bucket kept the bin charged with mate-

two sizes of stone used in the concrete (Continued on next page)



Operators also like the large, ground-grip, low pressure tires — same size, front and rear. These massive tires give utmost stability and traction, and keep side draft to a minimum.

And because operators can do better work with GALION Motor Graders, it pays you to buy and specify "GALION." Write for catalog and name of nearest Distributor.

THE GALION IRON WORKS & MFG. CO.

Galion, Ohio, U.S.A.

ROLLERS GRADERS .

Two-Lane Road Made Into a Dual Highway

(Continued from preceding page)

is given in the following table:

Sieve Size	Per		
	No. 2 Stone	No. 6 Stone	Sand
21/2-inch	100 90-100		
2-inch 134-inch	35-70	100	****
1-inch	0-15	90-100	
1/2-inch	0-5	25-60	
34-inch	****	****	100
No. 4	****	0-10	95-100
No. 16	****		45-80
No. 30	****	****	20-60
No. 50	****	****	10-30
No. 100	****	****	1-8

Nine batch trucks—seven of them contractor-owned and two hired by the hour—hauled two 37.4-cubic-foot batches each from the plant to the paver. The average distance was 2.203 miles for the section in Baltimore County and 2.375 miles for the part that lies in Howard County. The trucks first backed under the aggregate bin for their loads of sand and stone, then ran under the cement bin on their way out to the highway. Separate metal containers on the trucks held the cement, which was not added to the batch until the entire contents of each batch compartment had been unloaded into the skip of the paver. In this way no cement blew away or was lost in transit. To assure a free flow of cement from the storage bin, a Schramm air compressor agitated the material and kept it from sticking to the metal sides of the bin.

Eight-Bag Batch

Water for the mix was pumped from creeks along the project by a Jaeger 3-inch pump into two 1,000-gallon tank trucks. One such truck was always at the paver, a Ransome 34-E dual-drum with a 30-foot boom, while the other was getting its tank refilled. Another Jaeger 3-inch pump was mounted on the paver to transfer the water from the tank truck to the paver tank. The tank trucks advanced under their own power in close proximity to the paver and connected to it by 100 feet of 2-inch hose. The batches were mixed 1½ minutes

The batches were mixed 1½ minutes in both drums of the paver, with a sin-





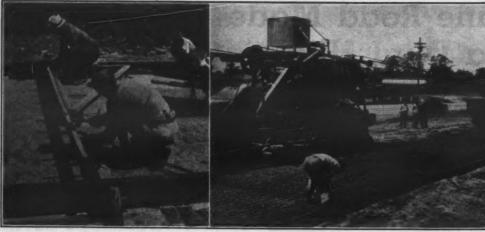
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C. & E. M. Photos

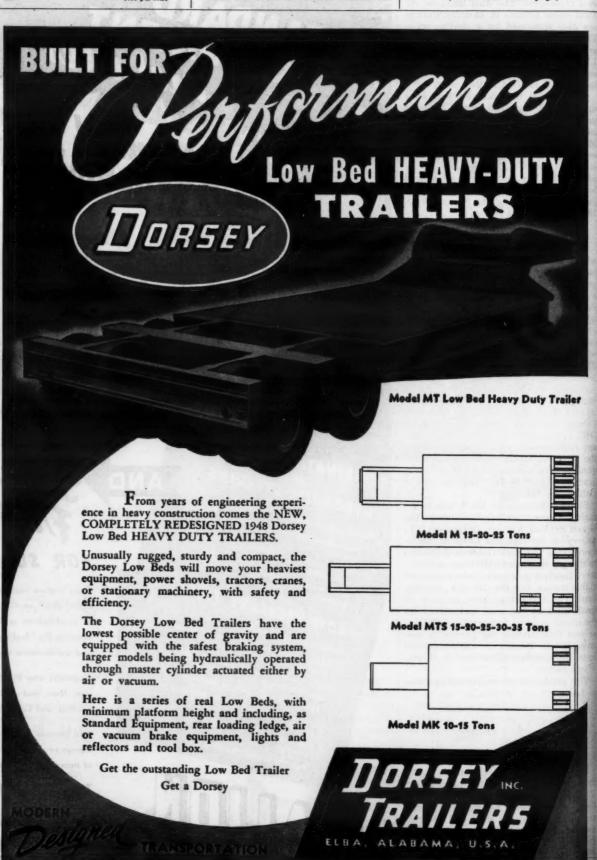
gle batch yielding 37.4 cubic feet of concrete. Typical batch weights were:

-	- A b		
	Cement Sand No. 6 stone	781 1,490 1,499	lbs.
	No. 2 stone Water (5 gals. per bag)	1,508	
	Air	3.03 per	cent

These scenes from the Hechler Brothers concrete-paving project in Maryland show (left workmen setting a Dow-Weld joint assembly, and a Ransome 34-E dual-drum paver (Above) dumping concrete on welded-wire-mesh reinforcement.

Preparations for the Concrete On the job were 4,000 linear feet of 9-inch steel forms within which the

concrete slab was laid to a uniform depth of 9 inches. Blaw-Knox and Helt-(Continued on next page)







zel forms were used in about equal pro portions, with one type set on one side of the slab, and the other type set on the opposite side. The forms were set and staked securely by hand. From 400 to 600 feet of forms and finished grade re kept ahead of the paver.

ft)

After the forms were in place, 12 feet apart, a Buckeye Finegrader rolled over them throwing any excess dirt out into the center parkway. A scratch template was then pulled along to check for the exact 9 inches of depth required, and the foundation course was given a final compaction with a 500-pound hand

Along the side of the form which would be the center of the 24-foot pavement, a metal keyway, ¾ inch deep and 2½ inches in height, was attached. This marks the first time that such longitudinal keyways have been used in Maryland concrete-road construction. They were placed midway in the 9-inch depth of slab. An additional tie or bond between the adjoining 12-foot slabs was provided by %-inch circular reinforcing bars and 48-inch longitudinal dowels set on 4-foot centers down the center line of the pavement. Holes were made through both the forms and keyways to receive these steel rods, which were left projecting halfway out along one side of the forms as the first lane was

Contraction and Expansion Joints

Over the prepared grade Dow-Weld contraction and expansion joints were set-the former at 40-foot intervals, and the latter only every 600 feet. Both types of joint assemblies consisted of elve ¾-inch dowels on 12-inch cen-

ers across the slab. On the side away from the progress of the concrete the dowels are hooked, while the straight

ends face towards the pour.

At the expansion joint the dowels pass through a cork filler ¾ inch thick which extends across the full 12-foot width of slab. The material is 81/2 inches in depth, with its top 1/2 inch below the slab surface. Great care was exercised in setting these joints. As the assembly was placed, it was prevented from turn-ing off a vertical plane by a transverse 2 x 4 with a metal shoe at each end, which was laid across the top of the opposite forms. To keep the joint exctly perpendicular to the sides of the a triangular wooden template was placed along one form, with one leg extending out halfway across the joint. With the joint assembly bearing against the template, it was firmly secured in place in the ground with ten 8-inch pins, five on each side of the

On top of the cork expansion material was placed a metal cap which extended 11/2 inches below the top on each side. This remained in place until after the concrete had attained its initial set; then it was removed by the finishers. Final preparations for placing the concrete included a light wetting down of the foundation layer and an application of oil to the sides of the forms.

Laying Concrete

Paving operations started, May 18, at the west end of the job on the outer 12-foot lane, and proceeded towards the batch plant. The paver always worked outside the forms in the center parkway strip. The batch trucks traveled

The Blaw-Knox paddle-type spreader, left, followed by a Jaeger-Lake chine, works on the Hechler widening job in Maryland. Above is th tudinal Finisher used on the job, followed by finishers with straight-edge. yland. Above is the Koehring L rs with straight-edges and a fiber

back and forth from plant to paver on the existing two-lane road. As the plant was reached with this first lane, the operations were shifted back to the west end for paving the adjoining lane. The east half of the project followed next.

The customary procedure for the Ransome 34-E dual-drum paver was to place enough concrete between the forms to fill them to a depth of 7 inches for a length of 80 feet, or the distance

(Concluded on next page)

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rete is lightweight, ratertight, with 13-eet chute, controlled higher discharge and lower center of grav-ity. Hauls sand,

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H.P. and 3 H.P. Gaseline Engine models?

Rectric model; 1½ H.P. Electric Shapled model; and a Pneumatic model; filable. Gaseline Engine models also open odel are

MALL TOOL COMPANY, 7743 South Chicago Ave., Chicago 19, III.

Two-Lane Road Made Into a Dual Highway

(Continued from preceding page)

between two slabs within three contraction joints. The concrete thus deposited on the grade was struck off to the proper depth by a Blaw-Knox paddle-type spreader. Welded-wiremesh reinforcement was then placed on top of the 7 inches of concrete, while the paver and spreader moved back to add the remaining 2 inches of concrete.

Behind the spreader came a Jaeger-Lakewood finishing machine which made two passes over the surface of the concrete. This was followed by a Koehring Longitudinal Finisher which carried steel strips 12 feet long x 2½ inches wide x ¾ inch thick. From the back of the Longitudinal Finisher these strips of steel were inserted into the concrete at each contraction joint, and pushed down flush with the surface.

pushed down flush with the surface. Behind this equipment, finishers checked for any irregularities with 10-foot steel straight-edges, and then pulled a fiber bow belt over the surface of the concrete. The belt was 14 feet long and 12 inches wide, and was moved along by a man on each side. Working from two 4-wheel bridges, the finishers then edged around the joints with ¼-inch edging tools. They later pulled the caps from the expansion joints and the steel strips from the contraction joints. The concrete was cured with an application of cut-back asphalt, 0.5 gallon to the square yard, which was sprayed on from a single-nozzle machine working from a 4-wheel bridge.

Forms were generally removed the day after the paving. The steel sections on the side with the longitudinal dowels

were first pulled back from the side of the slab so as to clear the projecting rods. The joints were poured later with asphalt, and an 8-foot shoulder was built along the outside lane. The new pavement has a crown of 2½ inches from the center line, while the shoulder slope is ½ inch to the foot. The average paving production was 2,000 linear feet of 12-foot lane in a single 10-hour shift. A force of 50 men was employed on the project.

Quantities and Personnel

The major items in this 4.998-mile concrete-paving project included:

Excavation 53,000 cu. yds. 76,500 sq. yds. Reinforced-concrete pavement, 9-inch uniform depth 75,500 sq. yds.

Hechler Brothers, the Richmond, Va., contractor, was represented on the job by Henry L. Howard, Superintendent. For the Maryland State Roads Commission, B. F. Thomas was Resident Engineer. The Commission is headed by W. F. Childs, Jr., Chief Engineer, with W. C. Hopkins as Deputy Chief Engineer.

Material-Handlers For Light-Duty Use

Tructractor units with tip or dump bodies for light-duty materials handling are manufactured by the Clark Equipment Co., Industrial Truck Division, Battle Creek, Mich. These gasoline-powered 3-wheel tractors have a capacity of 4,000 pounds. Each style is made in two models with a body capacity of either 30 or 40 cubic feet. The Clark Tructractor will travel under its own power at speeds up to 12¾ mph.



The Glark Tructractor shown here is the tip-body Model 30 which has a capacity of 30 cubic feet. The unit handles sand, gravel, wet concryte, etc. It is also available in a dump-body style.

are mounted over the drive axle and carried ahead of the operator; they can be controlled without dismounting from the tractor seat. Both models have a tread of 43 inches, a turning radius of 124 inches, and a wheelbase of 84¾ inches. The tip bodies have a dump clearance of 6 inches; the dump bodies, a dump clearance of 12 inches.

Further information may be secured

from the company, or by using the enclosed Request Card. Circle No. 31.

Gooseneck-Trailer Data

A 32-page catalog on the Rogers line of heavy-duty gooseneck trailers has been released by the Rogers Bros. Corp., 108 Orchard St., Albion, Pa. Catalog No. 84 covers historic highlights in the development of heavy-duty trailers; the features of the Rogers trailers, including the various types of rear assemblies, goosenecks, frames, spindles, etc.; and special and optional equipment for use with the trailers. It also lists in detail each model of Rogers trailer including the Types D, T, H, and S; the girder and pole types; and the Rogers Tagalong trailers.

Specifications listed include the sizes and styles in which each type of trailers made, the rear assembly used, deck

dimensions, weight, springs, tires, etc.
Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 54.



This amazing step-up in frequency of the vibrator head is made possible by a patented, non-eccentric rotor device found only in Vibro-Plus "Rollgear" vibrators.

50% higher frequency guaranteed—Low speed flexible shaft

- save as much as a bag of cement per cu. yd.
- · concrete of uniform strength and density
- less mechanical wear and tear
- o longer unit life

No time is lost for periodic stripping down. The flexible shaft can be lubricated in less than 20 seconds. The Vibrator Head Runs Dry. No clamping or screwing needed at the power source.

"Rollgear" is designed and built for long, uninterrupted work periods.

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VIBRO-PLUS CORPORATION

Internal and External Vibrating Equipment
243 West 55th Street, New York 19, New York



HELTZEL STEEL FORM & IRON CO. WARREN, OHIO . U. S. R.

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New Bridge Will Rise Over Tacoma Narrows

(Continued from page 1)

steady winds, even those of relatively low velocity, started the bridge oscillating visibly. The direction and extent of oscillation varied with the wind, and sometimes, even in quite gusty winds, the bridge appeared to be stable.

the bridge appeared to be stable.

However, it soon became apparent that the 8-foot solid trusses and the 39-foot solid concrete roadway combined to form a wind-catching condition which was detrimental to the stability of the structure. Engineering studies were being made in November, 1940, when a steady wind started the bridge fluttering badly. Traffic was blocked off.

The hangers gave very suddenly, and with a crashing roar of steel the whole 2,800-foot main span fell down into about 200 feet of water, followed by the bridge sections from the piers to shore. The main towers were damaged, but the suspension cables remained intact. Movie cameras were on hand and the failure of the bridge was shown in many a newsreel.

The debris was salvaged insofar as possible, but the main span is still on the Tacoma Narrows bottom in from 150 to 200 feet of water. The east tower was salvaged, and many of its members found their way into highway-department bridges during the war years. Some of the suspension cables were also salvaged, but some snarled up and were cut loose high above the bay.

The massive concrete piers, one of which goes down to a foundation at elevation minus 225, remained intact. Because of 15-foot maximum tides and 8-mile-an-hour current through the narrows, these piers had been built extra large. Therefore, with relatively minor changes, these piers were available for reconstruction, eliminating further dangerous underwater work.

Design of New Structure

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Before final designs were completed on the new bridge, extensive studies and tests were conducted at the University of Washington laboratories, and a group of brilliant consulting engineers was called in. The Chairman of that board, Charles E. Andrew, is the principal consulting engineer in charge of design, design tests, and field operations for the new bridge. Other men in the

1621-XE Locust

group included Glenn B. Woodruff, John I. Parcel of the engineering firm of Sverdrup & Parcel, and Dr. Theodore von Karman, famous consulting aerodynamicist. Actual design work was done under supervision of C. E. Andrew, D. R. Smith, and N. E. Olson. Clarence B. Shain, Director of Highways, was active in the studies and designs, and in their review.

The overall length of the new bridge will be 7,250 feet, including approaches. Length of the bridge proper will be 5,979 feet; 5,000 feet will be a suspension structure, carried by hangers on two 20½-inch-diameter cables. The main span will be 2,800 feet long.

The new roadway will be four lanes wide, with two 3½-foot sidewalks for pedestrians. The heavy trusswork which will carry the roadway deck will clear low water by 184½ feet. The two main towers are to be 502 feet high, and will rest on the existing modified piers. The same cable anchorages will also be modified and re-used, as described later.

Beyond this point, however, the new structure differs somewhat radically from the old. The old bridge had 8-foot solid I-beam trusses, but the new one is to have fabricated open trusswork 33 feet deep. The deck of the old bridge was solid, but between each traffic lane of the new bridge there will be a grilled slot 2 feet 9¼ inches wide, to allow the wind to equalize above and below the deck. In the tests, smoke was used to check the efficiency of these slots.

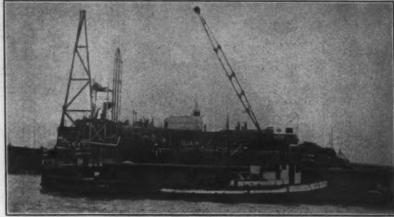
The new deck will be 55 per cent heavier than the old, but this will put

The new deck will be 55 per cent heavier than the old, but this will put less than 6 per cent more load on the heavy foundation piers. The new truss will be 58 times stiffer than the old, and if this is not enough to whip the aerodynamic forces, a damping mechanism of hydraulic cylinders, similar to the shock absorbers on an automobile, will resist any deck roll. This damping mechanism will be installed between the bridge deck and the structural stiffening trusswork, and at the towers.

On the old bridge, salt spray whipped up around the steel tower bases, but on the new, this condition has been corrected by raising the concrete work 40 feet above water. The distance between cables on the old bridge was 39 feet, and the towers were battered. On the new structure, there will be 60 feet between cables, and the towers will be vertical.

The deck of the new bridge will rise

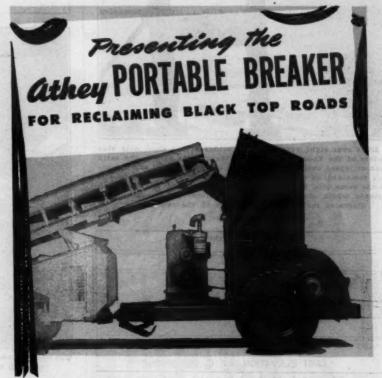
Kansas City 8, Mo.



During a pier pour on the Tacoma Marrows Bridge job, a Lima crane transfers aggregate from a barge to a portable batch hopper. A Mixermobile mixes concrete and Bell self-propelled buggies carry it to the pour.

from either approach on a 3 per cent grade to the center point, and will measure 46 feet 8½ inches curb to curb. Concrete traffic lanes will be 9 feet ½ inch wide, separated by steel grid slots set flush with the road surface. The slots between the inner traffic lane and the sidewalks will be only 1 foot 6% inches wide.

(Continued on next page)



Your answer to a low-cost method of reclaiming old rough black top roads . . . the new Athey Force-Feed Loader-Portable Breaker Plant . . . a pick-up, crush and return to subgrade operation, packaged in one unit.

After a motor grader has scarified the old pavement the Athey Force-Feed Loader picks up and transfers the broken material to the towed Portable Breaker . . . the impact-type mill reduces and drops the material back on the roadway . . . a shot of oil and it's ready for rolling into a smooth finished surface. Simple, fast and at a cost much less than is possible with any other method.

One man operates the Loader-Breaker Plant . . . its capacity ranges from 40 to 90 tons per hour, depending upon material and gradation required. There's no transportation to and from a central crushing plant . . . no loss of valuable road surfacing material . . . IT'S RE-WORKED, RIGHT ON THE ROAD.

The Athey Portable Breaker coupled to the Athey Force-Feed Loader.



See your Athey-"Caterpillar" Dealer for full details or write direct to

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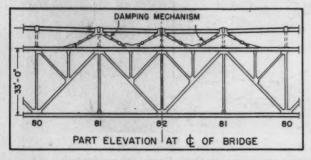




SAM MULKEY COMPANY

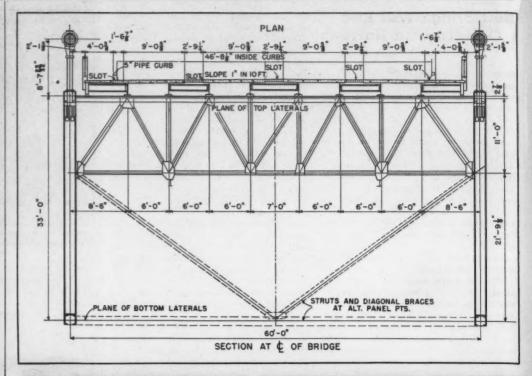


come Narrows in Washington failed—the main tirely, though part of the old steel superstruct shown here. Today the bridge is being rebuilt but to a new design calculated to resist wind aused the original failure. The accompanying dicate some features of the new design.





too, remained intact, and are being modified by the Woodworth existing pedestals have been blown off to a depth of 7 feet, re being built to a height of 24 feet above the old concrete.





The old concrete cable anchors which remained intact are being widened and lengthened for re-use by Woodworth & Co., and new eyebolts are being placed to take the 60-foot-wide cables of the new bridge.

New Bridge Will Rise Over Tacoma Narrows

(Continued from preceding page)

Modification Work Necessary

In order to re-use the existing piers and anchors, certain modifications were necessary. This work is being done by Woodworth & Co., Inc., under a sub-contract with Bethlehem. To Super-intendent E. F. Starbard of the Woodworth firm, it is familiar business, for he supervised the placement of con-crete when the old bridge was built. About 14 feet of concrete is being taken off each side of the east and

west anchors, involving the removal of about 5,500 cubic yards of concrete in each block. New concrete, as well as structural-steel cable-anchor eyebolts, are then being placed to widen and lengthen the anchors sufficiently to take

(C. & E. M. and Washington Toll Bridge Authority Photos)

the 60-foot-wide cables.

On each pier, the top of the existing pedestal is being blown off to a depth of 7 feet. Two new pedestals are to be built to a height of 24 feet above the old concrete, which will be 40 feet above the low-water line. The two big towers will rest on this concrete.

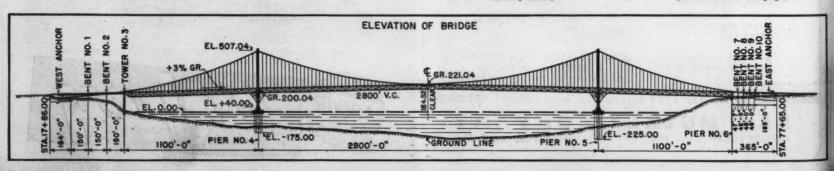
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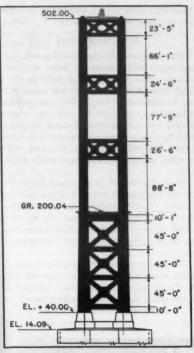
Other modification work consisted of reclaiming some of the structural-steel trusswork at the west approach. Some of this steel remained intact after the crash, and can be used in the new structure at that point.

Concrete Demolition

The demolition of concrete by explosives was one of the most exacting phases of modification work. The anchor blocks and the old pedestals had to be cut to lines almost as true as engineers could draw on a plan.

Superintendent Starbard of the Woodworth organization realized what (Continued on next page)





Towers 4 and 5 of the new Tacoma Marrows bridge will look like this.

he was up against, and he selected his crews and equipment very carefully to do the job as rapidly and as efficiently as possible. How well he made his selection can best be illustrated by saying that 5,508 cubic yards of the east anchorage block was removed in 5 weeks, and that the west anchorage was trimmed up in 6 weeks.

Air-compressor equipment includes a Le Roi 310-cfm machine, a Jaeger 210, and two Ingersoll-Rand portable 105's. These machines furnish the operating power for the Cleveland, Ingersoll-Rand, and Gardner-Denver pneumatic hand drills which are in use.

Demolition began first on the big anchors where the new suspension cables will be fastened. On each side of these anchors a slice about 14 feet thick was removed. Holes were drilled on 30-inch centers by the pneumatic drills, to a depth of 45 to 60 inches, with 48 inches a fair average. The concrete was very hard, but each driller managed to get about 180 feet of drilled hole in a 10-hour shift.

Each hole was then loaded with 2½

Each hole was then loaded with 2½ sticks of Atlas Gelodyn No. 3, Atlas No. 3 special, or Atlas 40 per cent

gelatin powder. Delays were used to fire the outside charge first, and this resulted in clean breakage in to the projected line. On the first shots, delays were not used, and the concrete tended to crack at an angle. When delays and 220-volt current were used with Primacord fuse, the concrete broke clean.

cord fuse, the concrete broke clean.

When a lift had been drilled and shot, the crew moved in again to start the next slice. Excellent performance records were established, too. Only 1/8 stick of powder per cubic yard was used on some of the material, and one stick per cubic yard demolished most of the anchor work.

Demolition work on top of the piers was somewhat more ticklish. Here the State limited shots to a maximum of 16 sticks per explosion. The holes were drilled only 18 inches apart and the gelatin charges were lighter. The depth of holes on the pier pedestals was never more than 48 inches. Despite this care, the drill crew managed to drill and fire an average of 227 holes per shift. This concrete fell off into the deep channel, of course, while the shore concrete was hauled away and stockpiled.

Considerable feather-wedging was also done at various places to make the face straight and true. Holes were first drilled at the project line, and then wedged moil points were driven in until the concrete cracked away. One big chunk of concrete weighing at least 10 tons was hewn from the base of pier No. 6 in this manner.

Concrete Form Work

State specifications for all exposed concrete work above ground line call for the use of plywood form faces. Below the ground the use of ordinary surfaced shiplap is permitted. Concrete form panels are being fabricated in a central carpenter yard where power saws and layout jigs are located. The forms are then set in place in the field, checked for line and grade, and bolted.

In general, 2 x 6 lumber is being used for studs, spaced on 16-inch centers. Wales are 6 x 6's, with double 2 x 6's on the anchor wall forms. Burke %-inch steel form bolts are being used to hold the forms on line during the pours.

hold the forms on line during the pours.

Work last year consisted principally of modifying the anchors and piers, but this year, after the structural steel is in and the cables are spun, concrete work will swing into high gear. There are several administration buildings to



C. & E. M. Photo Safety meetings are held each week by Bethlehem steel men on the Tacoma Marrows Bridge job. Here E. L. Heisten, with his back to the camera, reads safety rules to the men. And Washington State Safety Inspector J. P. Eurns of the Tacoma District is second from Heisten's right in the picture.

build, as well as the roadway pavement.

Concrete Placing

Separate set-ups are used for con-

crete work on land and on water. For the big anchors, there is a MultiFoote 27-E paver, a Lima crane, batch trucks, (Continued on next page)



"THE half of IT"

Sheppard Diesels consume HALF as much fuel per hour as gasoline engines

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Sheppard Diesels run on any one of 15 fuels, most of which cost less than HALF the price of gasoline

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45 H.P. 3 Cylinder Power Unit with power take-off and clutch. Also available as 2 to 36 K.W Generating Set



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OWER UNITS

New Bridge Will Rise Over Tacoma Narrows

(Continued from preceding page)

and the usual line-up of vibrators-in case, four Ingersoll-Rands on each anchor.

Concrete aggregates and sand, as well as bulk cement, are purchased from the commercial plant of George Scofield Co., Tacoma, Wash. The bulk cement is separated from the rest of each batch in a metal can in each compartment of the 3-batch trucks. The haul from the batch plant to the east pier is 5 miles. Nine trucks can handle the materials for a 250-cubic-yard pour, and the number is increased proportionately for the 350-cubic-yard pours which have been made.

The dry batches are dumped in the paver skip by the trucks. Mixing water is taken from a 3-inch city main which mes down to the job. Five ouncer of Darex air-entraining agent is added to each 1.1-cubic-yard batch to improve the workability of the concrete, and to prevent its segregation during handling.

At the discharge throat of the paver is a metal turntable made up in Woodworth's shop. This turntable, controlled from the paver, contains three Gar-Bro concrete buckets. When a bucket is filled, the table is revolved until another empty is under the paver discharge. Meanwhile the Lima crane picks up the filled bucket and transfers it to the pour. The empty is returned to the turntable, and another load picked up. This set-up will handle 60

cubic yards an hour quite easily.

Pours on the double 32 x 31-foot pedestals on the piers, out over the water, involved an interesting use of late-model equipment. All concrete

materials were first carried to the job by scows and tugs, and were mixed and placed at the site. It so happened that steel H-beams protruded pours at just the right height to hang a pouring platform. Cleats welded to ese upright steel members were used to support the timber platforms, which were built in such a manner that the concrete could be dumped off the outside edge of the platform, all around.

When the 10 and 14-foot-thick pours were formed, Starbard arranged for the proper flow of men and materials. First, about 2,000 sacks of cement were brought out to the pier on 60-sack sleds, and hoisted aboard by a Lima 26 crane. On another scow were 13 canvas water tanks, each containing 3,000 gallons, for concrete-mixing water. Tacoma Narrows is a part of the Pacific Ocean, and thus is salt water.

A separate scow was also towed out containing the sand and two sizes of rock aggregate required for the con-crete mix. This scow was tied up on the side nearest a portable 3-compart-ment Johnson weigh batcher. A Mixer-mobile 2-yard machine with its hoisting tower was also located on this side of

Bins in the batch plant were filled by the Lima crane, and the properly weighed batches were then dropped to the Mixermobile skip. Sacked cement was added, and the materials passed through the mixer where water from the fresh-water scow was added. Darex air-entraining agent was also added at

The mixed concrete was then hoisted up the Mixermobile tower to a transfer hopper on the pouring platform, where men with four new Bell self-powered 10-cubic-foot Prime-Movers waited to take it to the pour. A hopper tender operated a gate which filled the Bell

The Bell Prime-Movers, used as concrete buggies, turned in an excellent performance, according to Superintendent Starbard, who used them for the first time on this job. With their own motive and dumping power, their ability to move rapidly and easily was apparent from the start to the men who used them. A 350-yard pour was made in 13 hours, then this was cut to 11, then to 10, and the fourth pour of this size was made in 9½ hours.

The concrete was dropped straight down to the point of placement, without segregation, and it was vibrated by eumatic Ingersoll-Rand vibrators.

One of the unusual features of the pier concrete is the fact that the top course must be finished to within 3/1,000 inch. This will be done by topping out in a 12-inch lift. Special ma-chined-steel screed bars will be set with a surveyor's level to no tolerance. concrete will then be steel-float-finished to perfect smoothness, using the screed edges as a guide for the trowels.

This will insure full bearing when the heavy tower legs are placed

Structural Steel

The erection of structural steel, and the work to be done by John A. Roebling's Sons, will be the subject of a later article in this magazine when the work gets under way. The job will be interesting, for there will be about 15,500 tons of structural steel to erect, and the big suspension cables will contain 8,702 individual No. 6 wires with a total weight of approximately 6,000

T. M. Martinsen is Resident Engineer for Bethlehem. A veteran of the famous Golden Gate Bridge, Grand Coulee Dam, the Bonneville Dam locks, and many heavy buildings, Martinsen regards the Tacoma Narrows project as

routine.
"The chances are that we'll pay much more attention to riveting than we will to the lifts," he explained. "Riveting is the thing that eats up labor costs."

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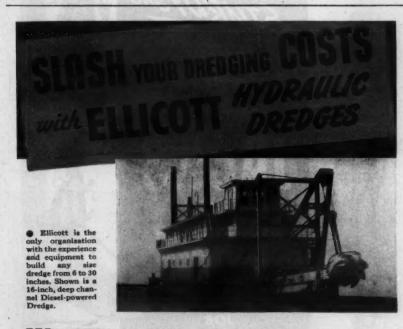
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WHATEVER your requirements, whether dredging a river channel, filling a swamp, or producing sand and gravel, your cost per cubic yard of material goes way down with an Ellicott Hydraulic Dredge.

That's because each Ellicott Dredge, from 6-inch to 30-inch machines, is igned to meet your needs. It has the right cutting head for material to be worked, the proper pump for length of the line to the disposal area—completely engineered from stem to stern to operate at the lowest cost.

Ellicott has built hydraulic dredges since 1885 and is the only organization in the world devoted exclusively to hydraulic dredge construction. When you specify

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ELLICOTT MACHINE CORPORATION





SINCE 1915

108 ORCHARD ST. ALBION, PENNA.

All in all, there will be about 330,000 rivets to drive. First of all, of course, the high towers will be built—the east tower first, and the west tower later by methods quite similar to those used in the construction of the original Tacoma Narrows Bridge.

Plans now are to use a 35-ton stiffleg derrick on a traveler base. When the towers are up, most of the work have to stop while John A. Roebling's Sons spins the suspension cables. Then the structural trusswork and deck members will go in, and the job will be

ready for paving.

h

It will be a big undertaking, loaded with danger. But the key men of the Bethlehem steel gang are oldsters—men with gray streaks in their hair, men experienced in outwitting danger. They hold a safety meeting once a week to talk things over. Later, when new workers come in, these meetings will help the newer men. It's one thing Bethlehem insists upon, along with topnotch work.

The men who are building the new ridge are confident that it will be there to stay. They know the problems are whipped. They believe the new ventilated deck and open trusswork will let this bridge stand for generations, rendering a much needed service to the Olympic Peninsula.

Concrete Vibrators In Two Main Styles

A line of internal concrete vibrators is available from Frank D. Messenger, P. O. Box 124, Fair Haven, Mich. The standard Messenger line includes 3 gasoline-powered units and 6 electri-cally powered models. All are furnished with carrying handles or on a wheelbarrow type of mounting. Power range of the gasoline-engine models is from to 4 hp; of the electric units, from 1 to 3 hp. Lighter direct-drive units powered by 1½-hp gasoline engines or 1-hp

electric motors are also available.

The Model AKS 4-hp gasoline unit has a 2%-inch-diameter vibrating head; the Model AB 2-hp unit has a 1%-inch vibrating head; and the Model ABS 3hp unit has a 2%-inch vibrating head. All of the electrical units have 1%-inch heads. Both electric and gasoline-powered models are furnished with 7, 14, 21, or 28 foot-long flexible shafts.

Further information may be secured from the company, or by using the en-closed Request Card. Circle No. 49.

Blast-Cleaning Unit

Cabinets for use in abrasive-cleaning operations are available from the Sanstorm Mfg. Co., Dept. B, Santa Clara and H Sts., Fresno, Calif. These self-contained suction-type blast-cleaning cabinets, and associated dust arresters, are designed to allow sanitary and dustfree operations in a minimum of space. They can be used for ferrous and non-ferrous metals, for castings, forgings, parts, and other objects requiring abrasive cleaning.

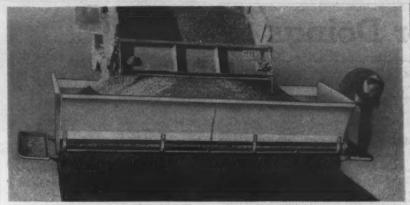
Blasting operations are controlled by three-position treadle control valve. It has an "off" position, an "abrasive" position, and a third position which permits "dusting-off" operations with a blast of clean air. The suction-blast cabinets come in sizes ranging from 20

x 30 to 36 x 60 inches.

Further information may be secured from the company, or by using the en-closed Request Card. Circle No. 40.

Sand, Rock Spreader

A spreader for the application of sand, stone chips, or rock is manufactured by the W. E. Grace Mfg. Co., 6007 S. Lamar St., Dallas 1, Texas. It is recommended by the company for spreading cover material on seal coats and surface treatments, or for base courses using 1-inch stone or smaller.



The Grace spreader is mounted on 6.00 | box. The operator's platforms—located x 9 tires, and is designed for towing by all standard dump trucks. Dual con-trols for the gate and transmission shift permit operation from either end of the

at both ends of the spreaderraised for passing posts or other ob-

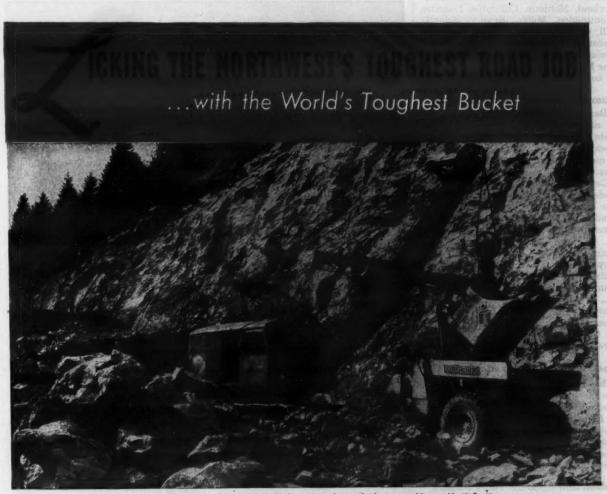
The Grace spreader is made in 8, 10,

and 11-foot widths. A block is furnished with it which will permit shutting off 12 inches of the feeding width. Larger blocks are available if desired. The 8-foot spreader is 9 feet 1 inch wide with the platforms up, and weighs 1,700 pounds. The 10-foot box is 11 feet 1 inch wide with the platforms up, and weighs 1,850 pounds. The 11-foot box is 12 feet 1 inch wide with the platforms up, and weighs 1,950 pounds. All three units are 54 inches in length with the handles collapsed.

Further information on this spreader may be secured from the company, or by using the enclosed Request Card. Circle No. 117.

Lingle Joins Taylor Forge

Thomas J. Lingle has been named Western Division Manager in charge of manufacturing operations at the Fon-tana, Calif., plant of the Taylor Forge & Pipe Works. He will also direct west-



nts and adapters working on North Santia Construction Company, Portland, Orea

n the Pacific Northwest, scene of the nation's most rugged road building jobs, the North Santiam highway is known as the toughest of them all. Roadway was carved out of the forest. Three million yards of muck and basalt rock had to be moved from 9.8 miles of road. Drilling and shooting averaged 60 cents a yard, and excavation sometimes ran as high as

ESCO all-cast manganese dipper buckets are one of the tools that licked the job. For over a year four of these buckets stood up under this beating with only minor maintenance - and they are ready for still more tough going on the next job.

Contractors the world over specify ESCO all-cast dippers for their toughest jobs. Here is why-

Last Longer on the Job

Made of shock-resisting manganese steel that surface hardens and gets tougher with use.

Lighter Weight...Bigger Payloads

Hollow back beam reduces weight while actually increasing strength. Manganese steel eliminates necessity of casting wearing parts excessively heavy to allow for wear. Shovel power moves payload instead of dead weight.

Clean cutting front with integrally cast tooth holders reduces digging resistance. Flaring position of teeth gives full bite. Tapered box prevents clogging, permits quick complete discharge.

Sizes from 1/3 to 6 yards ... Ask for Detailed Data

Details of construction of ESCO manganese dipper buckets are contained in catalog number 114-C. Your nearest ESCO representative will gladly give you a copy; or fill in and mail the on. Electric Steel Foundry, 2169 N.W. 25th Avenue, Portland 10, Oregon; 720 Porter Street, Danville, Illinois. Offices in Eugene, Oregon; Chicago; Honolulu; Houston; Los Angeles; York; San Francisco; Seattle and Spokane. In Canada, ESCO Limited, Vancouver, B.C.



OIPPER AND DRAGLINE BUCKETS

2169 N.W. 25th Ave					
Please send catalog	114-C	featuring	ERCO	oll-cost	munyone
dipper buckets to:					
Home		Cambridge Co.			
Address		500		1000	

Distributor Doings

Mixer Co. Changes Sales Set-Up

The Concrete Transport Mixer Co. of 4985 Fyler Ave., St. Louis 9, Mo., has announced a new sales policy for the distribution of its standard and Hi-Lo truck-mixers. Formerly handled directly by the main office, sales will now be through established construction-equipment dealers.

Several dealers have already been named under the new plan. The W. W. Williams Co., Columbus, Ohio, will handle the entire state of Ohio and the Kentucky counties of Kenton, Campbell, and Boone. Williams has offices in Columbus, Cincinnati, Toledo, and Cleveland. The Capitol Equipment Co. of Harrisburg will service several counties in eastern Pennsylvania—Potter, Tioga, Bradford, Susquehanna, Wayne, Clinton, Lycoming, Sullivan, Wyoming, Lackawanna, Centre, Union, Northumberland, Montour, Columbia, Luzerne, Huntingdon, Mifflin, Snyder, Schuylkill, Carbon, Juniata, Perry, Dauphin, Lebanon, Berks, Fulton, Franklin, Cumberland, Adams, York, and Lancaster. The F. S. Ray Co. of Houston will cover 35 counties in southeastern Texas.

Name Change for Barton-Stephens

Barton-Stephens & Co. has changed its name to Stephens-Jones, Inc. The main office will remain in Des Moines, Iowa, at 818 S.W. 9th. A branch office is maintained at 1909 E. 4th in Sioux City.

Companies the firm represents include LaPlant-Choate Mfg. Co., Inc., The Four Wheel Drive Auto Co., Rome Grader & Machinery Division, The General Excavator Co., Barnes Mfg. Co., Wausau Iron Works, American Chain & Cable Co., Inc., The Elgin Corp., Chicago Pneumatic Tool Co., The Buda Co., The Osgood Co., Meili-Blumberg Corp., Diamond Iron Works, Inc., Municipal Supply Co., Marvel Equipment Co., The T. L. Smith Co., Yaun Welding & Dragline Buckets, Inc., Air Cleaner Service Co., and the Wilshire Power Sweeper Co.

Speed Owatonna Deliveries in NYC

The Owatonna Tool Co. has opened a New York City warehouse in order to speed up deliveries to OTC dealers in the New York area. The warehouse is located at 54 Macdougal St., and will stock a complete line of OTC pullers, puller sets, puller parts, wrenches, and other types of special tools.

Madsen Iron Appoints Three Dealers

Three new sales outlets are announced by the Madsen Iron Works. These companies will handle executive sales and service for Madsen asphalt plants, Johnson float finishers, traveling mixing plants, and other aggregate-handling equipment. The dealers are: Mott Haven Equipment, 211 E. 149th St., New York, for New York City and surrounding counties; Hunter Tractor &

Machinery Co., 327 S. 16th St., Milwaukee, for Wisconsin and upper Michigan; and the Barrios Co., 227 International Trade Mart, New Orleans, for the state of Louisiana.

Mont, Dealer Completes Expansion

A \$100,000 building program has been completed by the Northland Machinery Co. of Sidney, Mont. Northland is distributor in eastern Montana for Allis-Chalmers and manufacturers of allied construction equipment. Officers of the firm are R. S. Nutt, President, R. H. Nutt, Vice President, and R. M. Nutt, Secretary-Treasurer.

Another Kansas Branch for Oehlert

The Oehlert Tractor & Equipment Co., Inc., recently celebrated the open-



This is the new branch office at Hays, Kans., which was opened recently by the Ochlert Tractor & Equipment Co., Inc.

ing of a new branch office at Hays, Kans. More than 1,000 visitors attended the open-house party held to mark the event. The festivities included door prizes, movies of equipment at work, refreshments, and a dance.

Among those in attendance as representatives of the Caterpillar Tractor Co. were F. D. Haberkorn, Central Sales Manager; M. H. Morsbach, District Representative with headquarters in Wichita, Kans.; and John Matalon,

Service Representative with headquarters in Topeka, Kans. Joseph W. Morgan of the Hyster Co. also attended the party. clos

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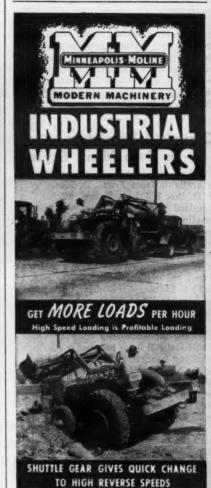
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The Hays branch occupies a 60 x 120foot building at the east city limits. It contains complete facilities for sales, parts distribution, and servicing. The main Oehlert office is at Salina, Kans.,

(Continued on next page)







An exclusive feature you will appreciate on MM Industrial Wheelers is sbuttle gear performance to streamline loading and dozing operations.

Straight line reverse lever on shuttle gear eliminates slow shifting—the shuttle gear also provides 6 forward and 6 reverse speeds up to 14.5 m.p.h. for saving valuable time on every job.

Easiest handling for their capacity, MM Industrial Wheelers are quick and easy to maneuver.

Front wheels are inset over steering knuckle pins to eliminate road shock and binding under heavy front-end load...minimize operator fatigue.

To assure low investment on equipment, MM Industrial Wheelers have a wide selection of attachments and a choice of rear wheel equipment that adapt them to many jobs.

Complete facts on Industrial Wheeler application are available at your MM Dealer or from—



The Red Cross Carries On! G I V E!

Distributor Doings

(Continued from preceding page)

and another branch is maintained at Colby. T. C. Oehlert, President of the company, stated that bringing service closer to the customer was the prime consideration in establishing the new office at Hays. Oehlert covers 27 counties in Kansas.

Vermont Equipment Degler Moves

The Vermont Road Equipment Co., Inc., has moved to a new building on River St. in Montpelier, Vt. Among the lines which this company handles ex-clusively in the state of Vermont are International Harvester tractors and engines, Galion motor graders and rollers, Frink snow plows, Four Wheel Drive Auto Co. trucks, Sullivan compressors, Gar Wood bodies, All-Purpose spreaders, Isaacson tractor equipment, Link-Belt Speeder shovels and cranes, and Hough Payloaders.

Hardsocg Distributor in Duluth

W. P. & R. S. Mars Co., Duluth, Minn. as been appointed a distributor by the Hardsocg Division of the Cardox Corp. of Chicago. The Mars Co. covers the northern counties of Wisconsin and the upper peninsula of Michigan. It will both horizontal and vertical earth drills, and other drilling equip-ment manufactured by the Hardsocg

Distributes Galion Hoists, Bodies

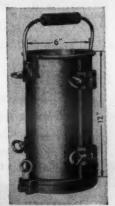
The Galion Allsteel Body Co. has aned the appointment of a new sales outlet in Columbus, Ohio. Buckeye Truck Body Builders, Inc., located at 339 N. Champion Ave., will offer a distribution and repair service for the entire line of Galion hydraulic hoists and

Bucyrus-Erie Canadian Distributor

A Canadian distributor, Wilkinson & McClean, Ltd., has been named by the Bucyrus-Erie Co. Its offices are in Calgary, Edmonton, and Lethbridge, Al-

The company will handle the complete line of Bucyrus-Erie blast-hole drills, excavators, draglines, and related equipment.

MOLINE **CONCRETE TEST** CYLINDER MOLD



Made of refined malleable iron, accurately machined, with bronze wing nuts and swing bolts.

MOLINE IRON WORKS

MOLINE, ILLINOIS, U.S.A. Seventy Years of Service



N. C. Dealer Has 50-Year History

A history of almost 50 years in the selling of construction equipment is behind Eli Franklin Craven, founder of the E. F. Craven Co. of Greensboro, N. C. In 1900 Mr. Craven began selling Acme road machinery from Greens-boro headquarters. Seven years later he started his own company which has become one of the largest of its kind in the United States.

In 1919 the company occupied a plant covering 13,000 square feet. Today, constant expansion, it occupie a building of approximately 40,000 square feet. In 1907 the company sold \$8,000 worth of equipment; forty years later its annual business approximated \$4,000,000. Mr. Craven is assisted in the business by his two sons: F. Duval Craven is General Manager and E. As-

Lines handled by Craven include General Motors diesel power units, Pioneer conveyors, Allis-Chalmers tractors, Wisconsin engines, Hough

(Concluded on next page)

Brute Strength and a "Delicate Touch"

An OLIVER 'Cletrac' Plus Advantage



Clearing a right-of-way for power lines is a job that requires an ideal combination of brute strength and perfect control. The answer . . . OLIVER

This Model FDE equipped with a shear dozer and tree pusher mounted on a Drott Trailbuilder is the ideal unit for land clearing and grubbing. It removes only the minimum amount of top soil

It removes only the minimum amount of top soil
... yet it effectively clears the right-of-way.
The husky OLIVER "Cletrac" Model FDE provides plenty of rugged power for the toughest terrain. And the new OLIVER "Cletrac" air steer-

ing and braking system provides the perfect control so necessary for fast, efficient operation, on level ground or steep slopes. Add to this, the fact that there is always power on both tracks . . . even on turns . . . and it's easy to see why the OLIVER "Cletrac" combination of brute strength always the light touch on the controls is the ideal plus the light touch on the controls is the ideal unit for any job.

For all the facts, see your OLIVER Industrial Distributor or write to The OLIVER Corporation, Industrial Division, 19300 Euclid Avenue, Cleve-

a product of

The **OLIVER** Corporation

A complete line of Crawler and Industrial Wi



"THE SIGN OF EXTRA SERVICE

Distributor Doings

(Continued from preceding page)

Payloaders and sweepers, Littleford Bros. road and maintenance equipment, Buffalo-Springfield rollers, Cleveland trenchers, Owen buckets, Bucyrus-Erie excavators, Gar Wood bulldozers, Baker bulldozers, Chicago Pneumatic pressors and demolition tools, Sasgen derricks, Clyde hoists and derricks, Skagit hoists, Erie pumps, Beebe Bros hoists, Disston chain saws, Northfield Husky graders, Seaman mixers, Toledo torches, Rex pumps, pavers, and mixers, and other lines.

The company does not feel that its obligation ends with the sale of a piece of equipment. It maintains a large repair shop and a big stock of parts. Any piece of equipment sold by the company can be overhauled or rebuilt in the Craven repair shop.

The Rozier-Ryan Co. Specializes

The Rozier-Ryan Co. of St. Louis, Mo., no longer handles the products of the Jaeger Machine Co. and allied lines. It is now concentrating its efforts on the sale and service of LeTourneau highspeed earth-moving machinery; Galion motor graders and rollers, Link-Belt Speeder shovels, cranes, draglines, and nch hoes; and the American Steel & Wire Co.'s Tiger line of wire rope, wire-rope slings, and wire-rope fittings.

Canadian Dealer for Hydro-Line

C. M. Murray, Ltd., has been appointed exclusive representative by the Hydro-Line Mfg. Co. Murray is lo-cated at 306 Foy Bldg., in Toronto, and will cover the provinces of Quebec and Ontario. The company will handle Hydro-Line air and hydraulic cylinders and special machinery

State Purchases 55 Maintainers

Fifty-five Huber road maintainers were delivered to the West Virginia State Road Commission in a period of six months by M. R. Hamill, road-equipment distributor of Charleston, W. Va. The deal involved two orders: the first, for 30 Hubers, was completed last spring; and in mid-September, the State ordered 25 more. West Virginia now has a Huber main-

GUMOUT cures operating troubles! When engines start

when engines start hard on chilly mornings . . . spit and sputter —don't cuss. Just pour Penn Drake GUMOUT in the fuel tank (one pint to ten gallons of gasoline) gasoline).

40% of all gas en-gine operating troubles are caused by harmful gum deposits in the fuel system. Gumout dissolves this gum-tunes the carburetor while the engine runs . . . cleans entire fuel system . . . saves gasoline.

Use GUMOUT in your tractors, trucks, compressors, dozers . . . in your own car. Order from your supplier now-or write to:

PENNSYLVANIA REFINING Co. 2712 Lisbon Road, Cleveland 4, Ohi Butler, Pa. Edgewater, N. J.

PENN DRAKE GEARTECK—liquid gear shield. Applied with brush or swab. Sets to an almost dry film. Lubricates exposed and open gears.



now has a Euber road maintainer operating in each of its 55 counties. road-equipment distributor of Charleston, W. Va., supplied the units in a period of six months.

tainer in operation in each of its 55 counties. The work of these machines includes shaping of gravel and dirt and secondary roads.

secondary roads, and shoulder stabilization and maintenance on both primary

Attachments for Tractors

Auxiliary equipment for use with Ford wheel tractors is available from the Dearborn Motors Corp., Dearborn, Mich. This equipment includes an angling dozer, a front-end loader, a rear-attached sickle-type mower, and the Danuser post-hole digger. Catalog sheets describing each piece of equipment in detail are new available. ment in detail are now available.

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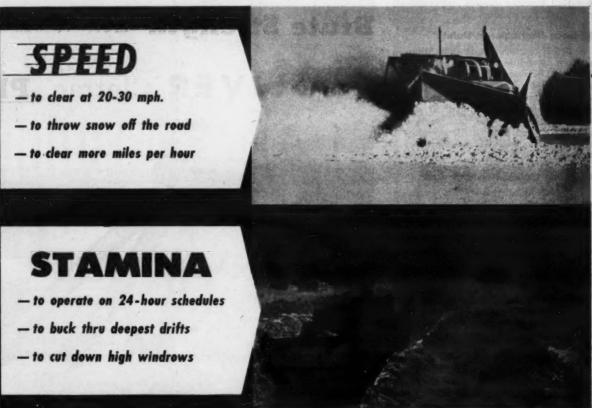
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A separate sheet is devoted to each piece of equipment, covering its features, specifications, method of mounting on the tractor, and other information for users. Close-up views of the units supplement the test.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 56.

McGehee Rejoins Truscon

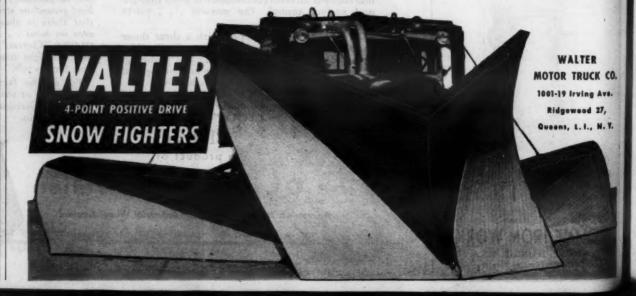
C. B. McGehee has returned to his position of General Manager of Sales for the Truscon Steel Co., Youngstown, Ohio, after a year's leave of absence.



WALTER SNOW FIGHTERS, with their great speed, power and trac-tion, not only open your roads fast -but they have the ruggedness and reserve ability to keep battling without fail, day and night, until the job is done. This Walter dependability is vital in winter emergencies where life and property are

Walter Snow Fighters clear faster because of their great engine power (240-250 hp.) and the unfailing 100% traction of the Four-Point Positive Drive. This provides maximum plowing speeds for pouring snow, opening drifts or travelling slippery surfaces and grades, withside-slipping, wheel spinning or stalling.

The ruggedness of Walter Snow Fighters results from their special. scientific construction for snow removal, including larger gear capacity, tractor type transmission, powerful chassis, high-capacity plows and wings, special hydraulic controls and other accessories essential to efficient, safe snow fighting under all possible conditions.



County Program Keeps Roads in Good Shape

Last Year 52 Miles Were Resurfaced: Maintenance Patching on Roads Done In Early Spring

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+ MERCER County in western Ohio has 321 miles of county-owned and maintained roads. Of this total 125 miles have a black-top surface, and the re-maining 196 miles are of traffic-bound acadam. Keeping these roads in shape to serve this typical midwestern agricultural county requires a well planned program of improvement as well as

The chief maintenance feature is a thorough patching job, wherever necessary, over all the roads the first thing in the spring. This takes care of the holes, ruts, and cracks that developed through the winter. Patching is usually done with a hand spray working off a bituminous pressure distributor. Early in the year during the cool weather an RT-6 tar is generally used. As the weather grows warmer, an emulsified asphalt is used to lessen the hazard to orkers of burns from the hot tar. The bitumen-covered hole or depression is filled with a No. 6 stone spread from a truck, and rolled by a Galion 7-ton three-wheel roller.

The gradation of the No. 6 stone is as follows:

Per Cent Passing

Road Improvements

Besides this spring maintenance patching, and the bridge repairs which continue through the year wherevercessary, Mercer County has a yearly program of road improvement or betterment. Last year, for instance, 22 miles of traffic-bound macadam roads were rebuilt into black-top roads, and 30 miles of black-top were given a bituminous surface treatment. For this work 465,000 gallons of bitumen and 17,000 tons of stone were required. These quantities included the following types of materials, in the following proportions:

190,000 gals. 175,000 gals. 17,000 tons

The bitumen was contracted for locally and shipped in tank cars to Celina, the county seat, on a siding of the Cincinnati Northern Railroad. The supplier kept the tank cars heated, and pumped out the material, as the County needed it, with a booster pump. The Rockford Stone Co. of Rockford, Ohio, located in the northwest corner of the County, furnished most of the stone, delivering it to the job site in trucks after an 8 to 12-mile haul. All hauling was done by County trucks.

Road-Mix

Maintenance on the traffic-bound macadam roads often entails breaking up the old material with scarifiers, adding

more stone, then shaping the roadbed with motor graders, and finally compacting the surface with steel smoothwheel rollers. It is these roads that are gradually being improved with a blacktop pavement of road-mix.

A typical road-mix job is handled in the following manner. A 16 to 18-foot traffic-bound macadam road is smoothed over by the graders; then RT-3 tar is applied at a rate of 0.5 gallon to the square yard for a prime. Next, from 80 to 90 pounds to the square yard of No. 46 stone is spread out and shot with either an RT-6 tar or MC-3 asphalt. The usual rate is one gallon of bitumen to 100 pounds of stone. The stone and bitumen are windrowed back and forth across the road by the motor graders until they are well mixed. Then the material is spread out and shaped to form a mat 1½ to 2 inches thick. Some No. 9 stone is usually added for a choke, and the surface is sealed with about 0.35 gallon to the square yard of XV emulsion or MS-2, and covered lightly with No. 6 stone.

The gradation of the No. 46 and No. 9

(Continued on next page)

needs a SILVER STEERING BOOSTER

Not just because it reduces the pull on steering levers to five pounds, or even less, but because it reduces wear on clutches, throwout bearings and brakes. Silver Steering Boosters pay their cost many times over in many ways. Any tractor dealer will install one on trial, ON APPROVAL, in less than thirty minutes. Ask your dealer to demonstrate a Silver Booster and you will never operate a tractor without one.

ilver BOOSTER MANUFACTURING CO.

CUMMER ASPHALT PLANTS

COMPLETE PLANTS FROM 60 TO 100 TONS PER HOUR **FURNISHED AS** ILLUSTRATED

Other Smaller Plants Portable **Mounted on Pneumatics**

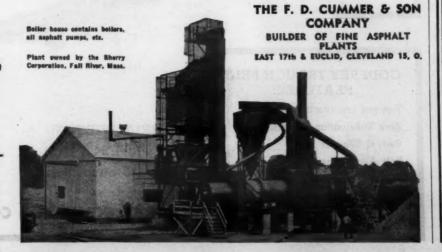
PROMPT SHIPMENT ON ALL SIZES FEEDERS-STORAGE BINS PUMPS-TIMERS AND OTHER UNITS AS REQUIRED

Literature Upon Request

CUMMER TWO-FIRE DRYER and 40-TON BIN UNIT

PHOTO BELOW SHOWS TYPICAL INSTALLATION 60 tons per hour capacity—located at Fall River, Mass.

Completely equipped with dust collection unit discharging into boot of hot elevator. Plant is equipped with 3-compartment cold storage hopper and feeder for regulation of feed into the dryer. 4' x 10' vibrating screen, 40ton bin, 1-ton mixer, dial scales complete with all motors and drives.



Eliminate POWER PROBLEMS on small jobs

WHEN you're out in the field on a small job and you're in need of a compact, light weight generating set . . . you'll be glad if you picked a . . . General.



General's a dependable performer on any job . . . where up to 2000 watts of power is required . There's no messing around with these compact gas engine driven units . . . all you do is . . . gas 'em up . . . push a button . . . and forget about 'em.

General lighting and power plants are available in both AC and DC models. Capacities range from 300 to 2000 watts.

WE'D be glad to send you more information on the GENERAL generating set to fill your needs . . . Write today to . . . Dept. CE, 243 Canal Street, New York, New York.

GENERAL LIGHTING PRODUCTS

KEEP INFORMED-

For further information and literature on products described in this issue, turn to page 16 for the Red Request Card. Our Reader Service Department will be glad to help you.

Contractors and Engineers Monthly 470 Fourth Ave. NEW YORK 16, N. Y.







County Program Keeps Roads in Good Shape

(Continued from preceding page)

aggregate is as follows:

Sieve Size	Per Cent	Passing
1000	No. 46	. No. 9
1-inch 34-inch 34-inch 34-inch	100 95-100 65-90 35-65	100
14-inch No. 4 No. 8 No. 16	0-15	95-100 60-90 0-20 0-10

Surface Treatment

One of the major county roads to receive a bituminous surface treatment last year was the Celina-Mendon highway, 8 miles long and 16 feet wide. Originally this stretch was a traffic-bound macadam that had been improved with a road-mix job. Four years ago it was surface-treated with MC-5 asphalt, but last year the bitumen used was Trinidad Lake asphalt. It was applied at a temperature of 350 degrees F, and at the rate of 0.35 gallon to the square yard, by a South Bend 1,130-gallon distributor mounted on an International truck. Half the road width was covered at a time by means of an 8-foot spraybar.

spraybar.

The bitumen was at once covered with 25 pounds to the square yard of No. 6 limestone, laid through a Buckeye spreader box pushed down the lane by reversing trucks. In this operation eight county-owned trucks, holding from 5 to 7 tons a load, hauled stone from Rockford. The stone was then rolled in by a Galion 8 to 12-ton tandem roller.

With this equipment the county forces usually disposed of from 8,000 to 10,000 gallons of bitumen a day. A 10,000-gallon tank car sufficed for 2½ to 3 miles of full-width surface treatment.

Mercer County

Mercer County is 18 miles wide from east to west, and 25 miles long from north to south. Its most important geographical feature is the 17,500-acre Grand Lake which lies about two-thirds in Mercer County and one-third in Auglaize County to the east. Originally known as Grand Reservoir, this 4-mile-wide body of water was artificially constructed as a feeder for the Miami and

FOR SECONDARY ROAD CONSTRUCTION ...

RIENS AGGMIXER

The subrines, chapping action to these ping action of these with other activation—to operate in connection gregates are used it thoroughly pulveyless, in these and the control of the control of

Erie Canal back in 1845. Dikes were built at either end of a 10-mile stretch of low, swampy ground, and with high ground to the north and south, the lake was kept filled by natural drainage. The lake has the distinction of being

The lake has the distinction of being a geographical dividing line for drainage in western Ohio. West of the lake the flow of water is to the Ohio and the Mississippi River Basin. East of Grand Lake the land drains to Lake Erie lying to the northeast.

Mercer County has a population of 26,256, according to the latest census, with about 6,000 living in Celina, the county seat. Its two main highways are U. S. 127, running north and south, and U. S. 33, laid out there in a northwest-southeast direction. It contains fourteen townships. The County maintains bridges in the townships, but has noth-

Typical surface treatment in Mercer County, Ohio: a South Bend distributor on an International truck applies Trinidad Lake asphalt at a temperature of 350 degrees (left); then a Buckeye spreader covers the asphalt with a No. 6 limestone seal (center); finally (right) an 8 to 12-ton Gallon tandem unit rolls in the stone, with Superintendent of Highways Kuhn on the roller, and County Engineer Major Mollenkopf standing alongside.

ing to do with the state highway system.

County Government

Administration of the county government is in the hands of three commissioners who are elected to serve four-year terms. Elections are held every two years, with two commissioners elected at one election, and the third commissioner at the following election. The make-up of the present County Board includes Anthony Kleinhenz as Chairman; Sam Rhodes and Gilbert Lampy, Members. Major J. F. Mollenkopf is County Engineer, and Robert Kuhn is Superintendent of

Highways. The highway budget last year amounted to \$150,000, the money being derived from auto licensing fees and gasoline taxes levied by the State of Ohio.

County Garage

County highway equipment is housed and maintained at the county garage on Warren Street in Celina. The 50-foot-front x 100-foot-deep single-story red-brick structure has shortcomings as to size, and lacks an adjoining yard for storage of either equipment or materials. But some storage space is avail-

(Concluded on next page)





GODFREY TROUGH BELT FEATURES:

Rugged construction thru-out Zerk Lubrication System Swivel Wheels Belt Alignment Rollers Large Wheels (42" x 6")

Pneumatic Tires
Adjustable Screen-Chute

BELT WIDTHS: 16" - 18" - 24"

4 ply, 28-ounce Duck

GODFREY CONVEYOR CO.

CAPACITY:

16" – 30 Yards 18" – 40 Yards 24" – 75 Yards

Gravel per Hour.

Elkhart 6, Ind.



& E. M. Photo This is the front of the Mercer County Highway Department garage in Celina, Ohio

able at the county fair grounds on the other side of town, and during the win-ter some equipment is maintained in the agricultural building at the fair. The County has drawn up plans for a new, larger, and more modern garage to be constructed in Celina some time in the

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The present building is entered through a 12-foot overhead door in the front or south side. To the right is a small office and parts room, partitioned off from the rest of the garage, where the County Superintendent has his records. Another 10-foot sliding door in the east wall near the north or rear of the building leads out onto an alley. The building is lighted by overhead electric bulbs, and by windows on the front and east side. Across the rear wall is a mezzanine platform for storage

Last winter a concrete floor was put in the building, also a grated drain, 40 feet long, down the center of the floor and connected to the city sewer. Equipment can now be washed off while it is inside the building, and the water disposed of in the drain. In winter the drain also gets rid of melted snow and

ice from the trucks and plows.

The garage is heated by a new Synchromatic coal furnace equipped with an automatic stoker. Feeder pipes with blower attachments disperse the air throughout the building.

Maintenance of Equipment

Along the east wall of the building are workbenches for the mechanics, equipped with bench vises and small

tools. Other shop equipment includes an Aro grease unit; Champion spark-plug cleaner; Royal charger for four batteries; 200 - pound anvil; 36 - inch grindstone for sharpening picks and axes; and a sickle grinder for sharpening mower blades. Equipment is fueled from a gas pump located in front of the

The major pieces of county equip-ment engaged in highway work include the following:

9 dump trucks 1 FWD truck for bridge maintenance and snow plowing

1 trailer truck with an 18-foot bed for moving equipment

3 pick-up 1½-ton trucks 1 tool truck for bridge crew

3 Galion motor graders

1 Caterpillar Thirty-Five tractor 2 International mowing machines

Centaur mowing machine

1 Galion tandem roller

Galion 7-ton three-wheel roller

1 Rosco patch kettle 1 Littleford kettle

Michigan 1/2-yard dragline

one-bag cement mixer

1 Buckeye spreader

Schramm 105-cfm air compressor

2 pumps, 2-inch—Gardner-Denver and Jaeger

1 Galion pull grader

1 Baker pull grader 1 International truck with South Bend distributor

On an average, 30 men are employed by Mercer County on highway maintenance. All but two of these—a me-chanic and helper stationed in the ga-

(FLEXIBLE ROAD JOINT MACHINE COMPANY)

rage-work on the roads. The County also has a survey crew of 8 to 10 men on drainage-ditch work.

Trench-Digging Machine

A folder on the Model 80 Trenchmobile has been made available by The Parsons Co., a Koehring Co. subsidiary, Box 431, Newton, Iowa. The Model 80 is described as a small, mobile, self-contained utility-size trench-digging machine. Specifications listed in Bulletin KP-272 cover the digging depth and width, traveling and digging speeds, conveyors, cutters, transmission, brakes, tires, engines, and dimensions.

Photographs show several features of the machine—the visibility it provides for the operator, the reversibility of the belt conveyor, the 4-point wheel sus-pension, and the operation of the

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 73.

Applied-Mathematics Text

A book on practical applications of mathematical theory and formulae has been published by The Industrial Press, 148 Lafayette St., New York 13, N. Y. It is designed to serve as a manual for draftsmen, designers, etc.

The first five chapters of "Mathematics at Work" present a condensed re-view of arithmetic, algebra, geometry, trigonometry and logarithms. The following twenty chapters provide practical job applications involving various mathematical principles and methods. Each problem is accompanied by a step-by-step analysis and example. A chapter of refresher questions on dif-ficult points in mathematics, mechanics, and strength of materials is also included.

"Mathematics at Work" is 728 pages long. It contains 196 drawings and illustrations, and 145 pages of tables, including logarithmic and trigonometric tables. Cost of the book is \$6.00.





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Problems Facing Equipment Dealers And the Business Outlook for 1949 Are Discussed Thoroughly as AED Holds 30th Annual Meeting

+ PROBLEMS confronting the construction-equipment industry took the spotlight at the recent 30th annual meeting of the Associated Equipment Distributors. A total of over 1,700 registered for the 5-day meeting, which opened on January 16 at the Stevens Hotel in Chicago.

The program was set up to permit plenty of time for distributors and manufacturers to make individual contacts. Manufacturers were not allowed to schedule any gatherings during the convention sessions, but they were en-couraged to hold "open house" at their headquarters rooms. Moreover, one entire day of the convention was set aside for these get-togethers, with no busi-ness sessions or official luncheons scheduled at that time.

Open-Forum Discussions

Problems confronting the industry were discussed in open-forum panels led by qualified speakers from the AED. The first of these panels was on the subject of take-home pay for the boss. Subjects included rental trends, salesmen's compensations, finance and insurance, plus credit, collection, and tax problems. The moderator of the discussion was G. W. Van Keppel of Kansas City.

The second panel-discussion period was devoted to a consideration of services rendered by the Association to its members, and a review of plans for an enlargement of this program. The third of these meetings was a special dis-tributor-manufacturer gathering, with the panel consisting of three members from each group, who discussed the various problems involved in distributor-manufacturer relations

Business Outlook

Results of a survey conducted by the AED on general business conditions and the outlook for 1949 were released in conjunction with the meeting by A. F. Garlinghouse, outgoing President of the Association. According to the survey, a majority of the nation's distributors expect a moderate drop in sales volume, lower profits, and a year marked by stiffened buyer resistance and keen competition. An interesting fact about the survey was the uniform-ity of answers throughout the country. Moreover, returns from Canadian distributors closely paralleled those from the United States. The greatest variations occurred within-not betweenindividual states and regions.

According to the survey, distributors are unanimous in predicting lower profits. Even those who foresee no drop in business are resigned to lower profits as a result of higher operating and selling costs and high corporation taxes. All agree that there is a sweeping shift to a buyer's market, and many feel that substantial numbers of buyers have been priced out of the market.

Distributors list a steady slowdown in collections and tightening of credit on the part of banks and finance com-panies as among the most significant events of the year. Most of them make a point of the fact that although expen-ditures for construction were up almost 26 per cent, sales did not increase proportionately. But generally speaking distributors prospered in 1948, with belter sales records than in 1947.

The survey revealed that distribut expect to encounter pressure for n trade-ins and more rental-purch
(Concluded on next page)

options this year. Most of them estimate that trade-ins are up 50 per cent over a year ago, and they say that buyers are asking for high allowances on old equipment, much of which was pur-

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The convention program called for several social activities for both members and their wives. These included the annual Early Birds' Breakfast, the welcoming luncheon, a ladies get-acquainted party, the President's cocktail party, a ladies' banquet, the annual birthday party, the installation luncheon, and the closing luncheon.

New Officers

William W. Bucher was elected Presmember of the Association for 15 years, 1947, Chairman of the Finance Committee in 1947, Chairman of the Na-Metropolitan New York constructionequipment distributors group for sev-

elected Executive Vice President. was Vice President of the AED in 1948 and has served as a regional director. Mr. Halladay is a civil engineer and was formerly engaged in highway and railroad engineering and contracting

before entering the equipment field.

R. L. Arnold has been re-elected an AED Vice President. He is President of the Arnold Machinery Co. and Tractor-Implement, Inc., Salt Lake City, Utah. Mr. Arnold has been in the construction-equipment business for 19 construction-equipment business for 19 ars. He has been a regional director of the AED for two years, and has served on a number of committees.

Jewel A. Benson and Douglas G. Macpherson were also elected Vice Presidents. Mr. Benson is President of Benson Tractor Co., Houston, Texas. He has been in the construction-equipdistributors group. He has served on various AED committees and as a re-

gional director.

Mr. Macpherson is President of Watson Jack & Co., Ltd., Montreal, Canada. He was instrumental in organizing the Canadian Associated Equipment Distributors in 1943, and is now President of that group after serving as Vice President. And Executive Vice President. He began his career in the condent. struction-equipment field in 1910.

Named as Treasurer for 1949 is E. J. Crosby, who is Treasurer of Hedge & Mattheis Co., Boston, Mass. He has been active in the AED for many years and served on many committees. He

was a 1948 regional director.
Frank G. Knight has been reappointed Executive Secretary of the Association by the newly elected officers. Mr. Knight has held this post for the past three years.

Regional Directors

Also elected at the meeting were directors for each of the fifteen AED regions. John B. Perkins was named Regional Director for Region 1, which covers the states of Maine, New Hamp-shire, Vermont, Massachusetts, Rhode Island, and Connecticut. Mr. Perkins is a general partner of Perkins-Eaton Machinery Co. of Boston, Mass. He is a Past Secretary of the New England Equipment Distributors. W. W. Bucher was re-elected a Di-

rector for Region 2, comprising the states of New York and New Jersey. Harry J. Hush, Vice President and Secretary of Griffin Equipment Corp., New York City, was also elected a Director in Region 2.

S. John Oechsle was re-elected Re-gional Director for Region 3, the state of Pennsylvania. Mr. Oechsle is President of Metalweld, Inc., of Philadel-

Harry Teal was elected Regional Director for Region 4, comprising West Virginia, North Carolina, Maryland, Delaware, and the District of Columbia. Mr. Teal is President of the Highway Machinery & Supply Co., Richmond,

Region 5 has as its Regional Director E. B. Wilkinson, Vice President and General Manager of Wilson-Weesner & Wilkinson Co., Knoxville, Tenn. Mr. Wilkinson was re-elected to the posiwilkinson was re-elected to the posi-tion he held last year. Region 5 com-prises Florida, eastern Tennessee, Ala-bama, Georgia, South Carolina, Puerto Rico, and the West Indies. J. Walker Wilson was re-elected Di-

rector of Region 6, comprising the states of Ohio and Kentucky. Mr. Wilson is head of the J. Walker Wilson Machin-

ery Co., Youngstown, Ohio.
Region 7—Michigan, Indiana, Illinois, and Wisconsin—again is under the direction of George E. Hillsman. Mr.

Hillsman is President of Hillsman Equipment, Chicago, Ill. C. F. Halladay, AED's new Executive

Vice President, was re-elected Regional Director for Region 8—Minnesota and

North and South Dakota.

Region 9—Iowa, Missouri, Kansas, and Nebraska—is again under the directorship of A. C. Anderson, President of Anderson Equipment Co., Omaha. Jewel A. Benson and R. L. Arnold, serving as AED Vice Presidents, have

also been re-elected as Directors of Regions 10 and 14, respectively. Region 10 covers Texas, Oklahoma, and Mexico; Region 14, New Mexico, Wyoming, Colorado, Utah, and El Paso, Texas. D. G. Macpherson, also an AED Vice

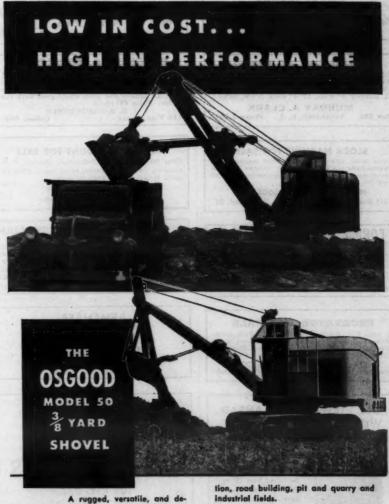
President, will handle Region 15, the Dominion of Canada.

Jack How, General Manager and partner of Edward R. Bacon Co., and Vice President of Western Machinery Co., both located in San Francisco, will again handle Region 11—Nevada, Cali-

again handle Region II—Revada, Cali-fornia, Arizona, and Hawaii. Region 12—Idaho, Washington, Ore-gon, and Montana—are under the di-rectorship of William H. Booth, Vice President of Clyde Equipment Co. of Seattle

And Region 13—Western Tennessee, Arkansas, Mississippi, and Louisiana are under the supervision of W. L. Parnell, President of the Construction Machinery Co. of Shreveport, La.





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chased second-hand at inflated prices. Year-end inventories are up from a year ago, but are better balanced. Mr. Garlinghouse indicated that there is a mass movement in the industry to meet competition and sales resistance with stepped-up merchandising and sales-promotion activities. And, he feels, customers can expect more and better service from distributors and dealers in the coming year. Social Activities

ident of the AED for 1949. Mr. Bucher is President of the R. E. Brooks Co. of New York City. He has been a and was Executive Vice President in 1948. He was Treasurer from 1943 to tional Affairs Committee in 1946, and a member of the Executive Committee for five years. He was President of the

C. F. Halladay, President of Halladay-Dettman Co., Sioux Falls, S. Dak., was

ment business for 30 years, is active in civic affairs, and is a Past President of Houston construction-equipment

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1	Index to Ad
	Acrow, Inc
	Armco Drainage & Metal Products, Inc. 83
	Badger Machine Co. 82 Barber-Greene Co. 50 Barco Mfg. Co. 45 Barnes Mfg. Co. 71 Behlen Mfg. Co. 101 Benjamin's For Motors. 78 Berner Engineering Co. 16 Bethlehem Steel Co. 85 Bicknell Mfg. Co. 39 Bucyrus-Erie Co. 59 Buffalo-Springfield Roller Co. 66 Butler Bin Co. 75
	Carter Co., Ralph B. 42 M Case Co., J. I. 65 M Cataphote Corp. 102 M Caterpillar Tractor Co. 8, 9 Celotex Corp. 21 M Chrysler Corp., Industrial Engine Div. 44 M Complete Machinery & Equipment Co., Inc. 58 M Construction Machinery Co. 62 Construction Products Corp. 34 Cummer & Son Co., F. D. 101 Cummins Engine Co., Inc. 57
	Davenport Besler Corp
	Eaton Mfg. Co
	Fairbanks, Morse & Co
	Galion Iron Works & Mfg. Co. 89 Gatke Corp. 87 General Lighting Products 101 GMC Truck & Coach Division 36 Godfrey Conveyor Co. 102 Gorman-Rupp Co. 80 Griffin Wellpoint Corp. 53 Gulf Oil Corp. 31 Hayward Co. 43
	Hayward Co
	Industrial Products Co

Kinney Mig. Co.	Ą
Koehring Co	
	M
LaCrosse Trailer Corp.	H
LaCrosse Trailer Corp	
Leschen & Sons Rope Co., A	7
LeTourneau, Inc., R. G	
	74
Lombard-Governor Corp.	냄
Lubriplate Division, Fiske Bros.	17
	13
Mail Tool Co.	i
Martin Machine Co.	15 14
Master Vibrator Co	14
Maxon Construction Co., Inc.	Д
McCaffrey Puddock Tealing Corn	26
McKiernen-Terry Corp.	n
	68
Meili-Blumberg Corp.	12
Messenger, Frank D. Michigan Power Shovel Co.	16
Miller Research Engineers, Ray	73 79
Minneapolis-Moline Power Implement	
Co	98
	17
Mixer Manufacturers Bureau	86
	99
Mulkey Co., Sam	93
	us.
Northfield Iron Co	
Naylor Pipe Co	i i
Oliver Corp.	
Osgood Co.	97
Ottawa Steel Products, Inc.	69
Owen Bucket Co.	94
Pennsylvania Refining Co.	00
Parsons Company	48
"Quick-Way" Truck Shovel Co	40
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Rice Pump & Machine Co	10
Roeth Vibrator Co.	63
Rogers Brothers Corp.	
Root Spring Scraper Co.	96
R.P.B. Corp.	17
	17 10
Salem Tool Co	10 45 15 95 44 01 52
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Justisen Dam Housing Project

Schultz and Lindsay move over 45,000 yards the first week

Schultz and Lindsay, of Fargo, M.D., sub-contracted to move 380,000 cubic yards of sandy slay and loam on streets and housing site for the Government fown of Riverdale, near Gartison Dam project. A LeTourneau fleet of 2 rubber-tired C Tournapulis and 4 crawler-drawn Scrapers are working 6 days a week . . . two 10-hour shifts a day . . . over hours varying from 400 to 2000 feet.

Average 1400' Cycle Every 3.9 Minutes

Jack Schultz estimates 45,000 yards were moved on the entire project the first week. Helping to keep this big job on schedule were two fast stepping Model C Tournapulls. Production records on one 700-foot hauf showed that each high-speed Tournapull delivered a load every 3.9 minutes . . . averaged 13 trips per hour. Based on Mr. Schultz's very conservative estimate of 9 pay yards per load, the 2 C Tournapulls easily maintained a combined output of 234 pay yards per hour.

Exclusive Features Pay Off

Production performance like this is possible because these 150 h.p. C Tournapulls have 4 speeds up to 17.3 m.p.h. They accel-

Schultz and Lindsay's C Tournapulls loaded fast . . . in less than a minute . . . took heaped bowls-full out of cut every trip.

erate fest, maintain high average hauling speed even on short hauls, cut seconds off each cycle. Then, you have revolutionary, power-proportioning differential that supplies constant lugging power for pulling through deep mud and sand... gets you on and off the toughest fills, up slick grades. Simple fings tip electric controls and positive electric power steer keep production high, because they make operating easier ... keep operators working at top efficiency right up to end of shift.

In fact, you've never seen so many advantages for delivering more yards per hour... and "lowest net cost per yard". Better get complete C Tournapull facts feday from your LeTourneau Distributor... ask him for a production estimate on your job.

On the fill, glant 21.00x25, low-pressure thes had compact material as Tournapull, provide loss



TATION STATE



MORE YARDS PER HOUR WIT